

BRISBANE CITY COUNCIL  
DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL BRANCH  
ELECTROLYSIS SECTION  
EAGLE FARM PUMPING STATION

OPERATING MANUAL FOR:

MT. GRAVATT TO EIGHT MILE PLAINS 470 DIA TRUNK WATER MAIN  
CATHODIC PROTECTION SYSTEM

CLIENT:

DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
WATER MAINTENANCE SECTION

**Brisbane City Council  
DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL SERVICES BRANCH**

**JS:**

**TO: KERRY McGOVERN / JEFF SAY**

**FROM: JIM STEELE**

**SUBJECT: FULTON ST - MT GRAVATT TO EIGHT MILE PLAINS  
CATHODIC PROTECTION SYSTEM - REGISTRATION**

**DATE: 22 March 1994**

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THE ABOVE CATHODIC PROTECTION SYSTEM IS REGISTERED FOR A MAXIMUM OUTPUT OF 50 mA DUE TO INTERFERENCE BEING DETECTED ON;

MOONIE PIPELINES  
AND  
QEC TOWER

AT HOLMEAD RD.

I BELIEVE THE INTERFERENCE IS DUE TO THE DEAD PLATE NOT BEING COATED TO THE SAME STANDARD AS THE PIPELINE.

THEREFORE I FURTHER BELIEVE THAT IF THIS MAIN IS EXTENDED THEN THE INTERFERENCE WILL DISAPPEAR ONCE THE COATING IS CORRECTLY INSTALLED ON THE FIELD JOINT OF THE EXTENSION.

TELECOM, SEQEB AND ALLGAS HAVE ALREADY BEEN TESTED AT 1 AMP WITH NO INTERFERENCE BEING DETECTED.

JIM STEELE

# FILE NOTE

## EAGLES FARM Pump STN.

(A) P/S 2 (prot) / (unprot)  
- 427 / -421

Conduit saddles across insul. flange.

- 432 / -417

### TESTED FLANGES & BOLTS

(1) FLANGE / FLANGE RESIST. - 22 OHMS.

(2) GENERALLY ALL BOLTS FAILED TESTING.

(B) P/S 1

FLANGES / FLANGES 41 OHMS.

GENERALLY ALL BOLTS SATISFACTORY

3 BOLTS  $\approx$  40 OHMS.

## MANUAL CONTENTS

- 1.0 Introduction
- 2.0 Corrosion and Cathodic Protection
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  - 4.4 Anodes
  - 4.5 Test Points
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  - 7.1 Monthly maintenance procedure.
  - 7.2 Six monthly maintenance procedure.
  - 7.3 Sixty monthly maintenance procedure.

(1.0) INTRODUCTION

Steel when buried or immersed has a tendency to corrode (rust) as the oxidised form is more stable than the metal.

Because of this, precautions must be taken to stop or minimise 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 practicable to expect a perfect coating during construction and coating damage will also occur with time. Because of this, corrosion may occur at imperfections.

(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 low 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 and is generally measured against a standard reference electrode, which permits a reproducible potential at which corrosion does not occur to be quoted.

**(3.0)        MAINS DETAILS**

**Size:**                    Dia 454 mm mild steel cement lined

**Coating:**                Medium Density Fusion Bonded Polyethylene outer coating.

**Length:**                1550 M

**Location:**              Tryon St Mt. Gravatt, Capalaba Rd. end to Holmead Rd. opposite QEC tower. and extending to Pinelands Rd. Sunnybank.

**Construction Drawings:**        Not available.

**(4.0) CATHODIC PROTECTION DETAILS**

- 4.1 Type of Cathodic Protection: Impressed Current
- 4.2 Rectifier: Standard 32 Volt, 10 Amp direct current output enclosed in a stainless steel switchboard. Rectifier has a 240VAC supply from a nearby SEQEB pillar box No.1300, in Ditmas St. Wishart. Rectifier is located behind the townhouses located on the corner of Fulton and Ditmas St. UBD Map 44 E5
- 4.3 Cathode: The cathode point is located on the 450 dia main approx. five metres from the rectifier heading towards the creek where a coupon test point has been installed. The cathode is the point where the cabling from the rectifier is attached to the structure under cathodic protection.
- 4.4 Anodes: One silicon iron anode was installed approximately 138 metres from the trunk mains in a vertical bed 5 metres deep. The anodes were first backfilled with a cokebreeze surround to improve anode ground resistance. The anode location is identified by an in-ground pit.
- 4.5 Testpoints: Testpoints are installed on cathodically protected structures to enable testing to confirm that full cathodic protection of the structure is maintained.  
  
On these mains 4 testpoints have been installed. For further details see CP details layout drg.
- 4.6 Associated Drawings:
 

486/6/25-AA1C0021E	Std Rectifier Wiring Diagram
486/1/22-C0023E	Silicone Iron Anode details.
486/6/25-AA1C0026E	Installation details conduit and rectifier.
486/6/25-AA1C0024E	Vertical groundbed details.
No number	Maintenance Details.
486/6/6-UF1C004E	470 dia MSCL water trunk main CP details.
- 4.7 Associated Standards:
 

AS 2832.1	1985	Pipes, Cables, Ducts, Guide to Cathodic Protection. Part 1
AS 3000	1991	Australian Wiring Rules
- 4.8 Government Regulations: Queensland Electricity Acts and Regulations

**(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.

NOTE: Details of above testing have not been included in this manual but are available upon request.

**(6.0) CONCLUSION**

Full cathodic protection has been achieved on this section of the trunk mains.

The cathodic protection system is to be registered with the Queensland Electricity Commission and has approval to operate.

**(7.0) MAINTENANCE**

The cathodic protection system is maintained on a monthly basis after commissioning. These checks involve testing rectifier operation and recording of pipe to soil potentials. Monthly, Six monthly and sixty monthly maintenance procedures are detailed as attached below.

(7.1) CPS Monthly 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.

(7.2) 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.

(7.3) 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 for "continue to operate" permit if applicable.

**Brisbane City Council**  
**Dept. W.S.& S.**  
**Metropolitan Division**  
**Eagle Farm Pump Station**

Cathodic Protection System Loop Resistance

Date: 4th March 1994

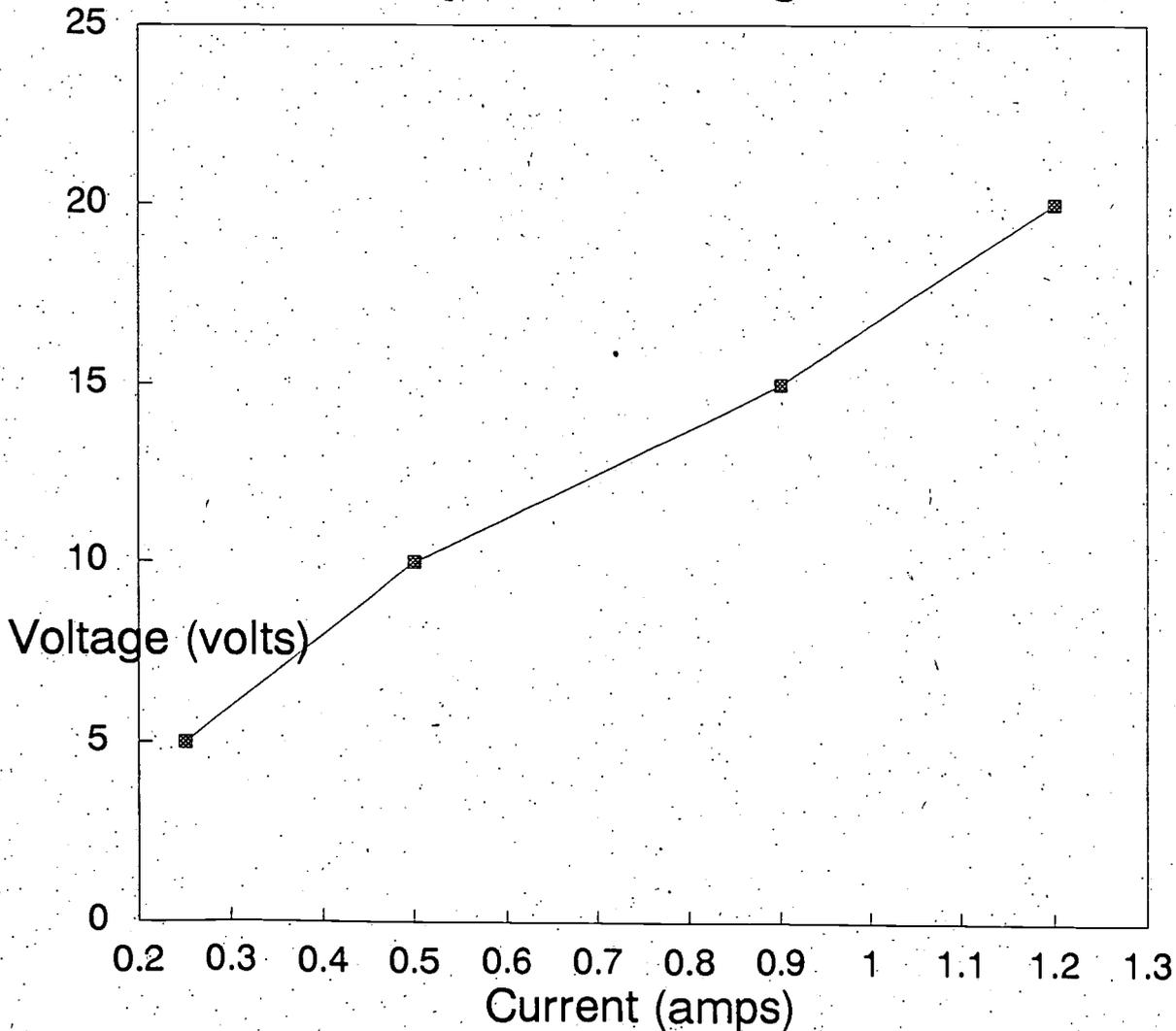
Cathodic Protection System: Mt. Gravatt to Eight Mile Plains water trunk mains.

System Operating Volts 0.5 System Operating amps 0.04

Test Voltage:		Test Current:	
(volts)		(amps)	
5		0.25	
10		0.5	
15		0.9	
20		1.2	

Loop Resistance (ohms)
16.66667

Graph of System voltage vs current.

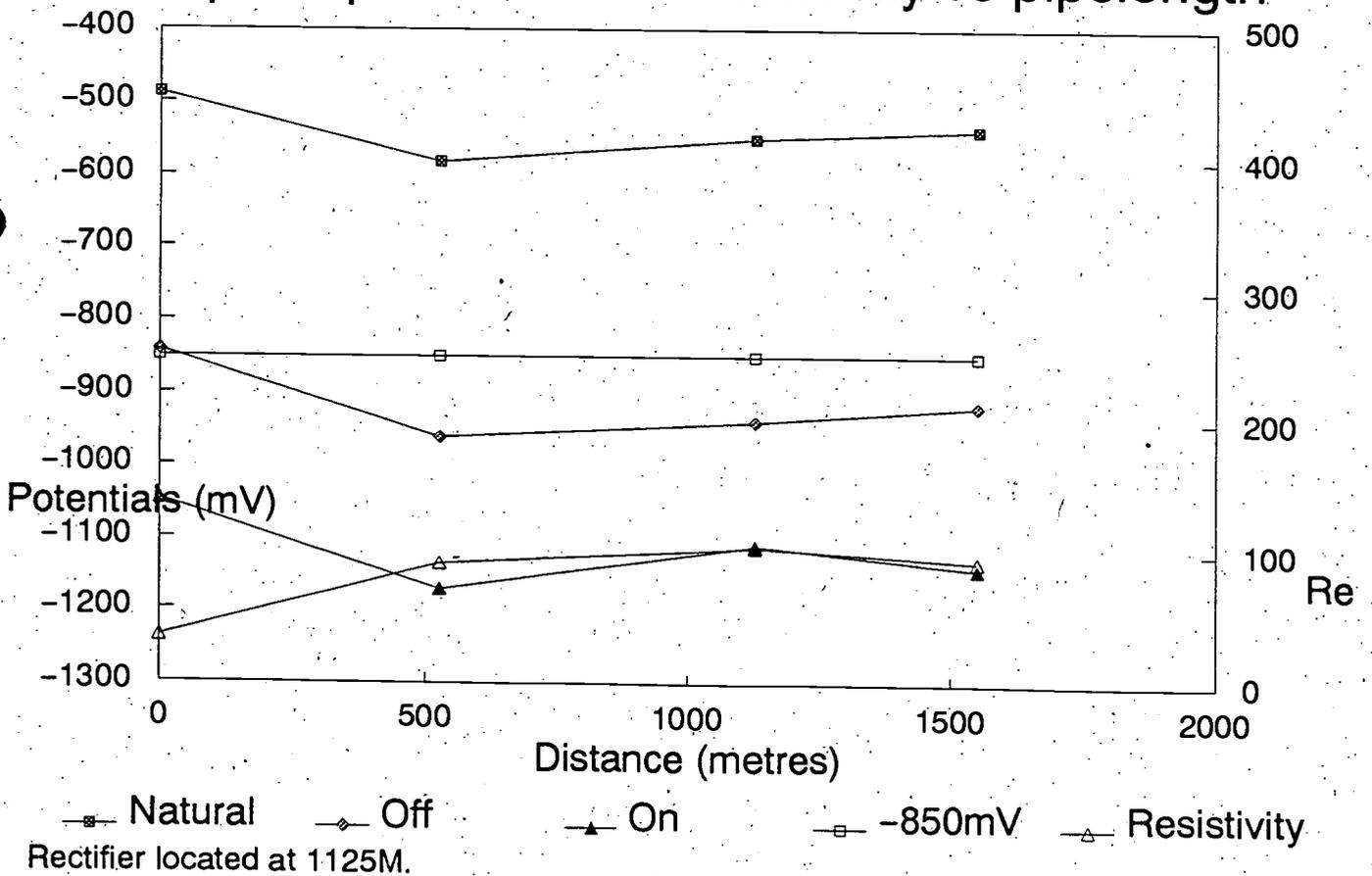


**Brisbane City Council**  
**Dept. W.S.& S.**  
**Metropolitan Division**  
**Eagle Farm Pumping Station**  
**Date: 4th March 1994**  
**Electrical Workshop**

**System:** Mt. Gravatt to Eight Mile Plains 470 dia. trunk mains.  
Cathodic Protection System reference potential and earth resistivity graph.

Test Point number	Distances to T.P. (metres)	Potentials to CuSO <sub>4</sub>			Resistivities at 2 metres (ohm.metres)
		Natural (mV)	Off (mV)	On (mV)	
1	0	-488	-841	-1048	34.3
2	525	-582	-961	-1171	91.6
3	1125	-550	-940	-1110	104.3
4	1550	-537	-918	-1142	93.4

**Graph of potentials and resistivity vs pipelength**



**BRISBANE CITY COUNCIL**  
**DEPARTMENT OF WATER SUPPLY AND SEWERAGE**  
**MECHANICAL AND ELECTRICAL SECTION**

INTERFERENCE SURVEY RESULTS

JOB DESCRIPTION: - **FULTON ST**  
**19/1/94**

UNIT READING: - **1 A 10.5 V**

	READING	TEST POINT I.D.	LOCATION	SWING
ON OFF	-1269 -1269		AGL TP 263 CARAVAN PK	0 mV
ON OFF	-536 -536		DEC TOWER 1548	0 mV
ON OFF	-576 -576		" " 1547	0 mV
ON OFF	-375 -422		" " 1546	+47 mV
ON OFF	-486 -486		HOLMEAD ST CARAVAN PK TAPS	0 mV
ON OFF	-912 -998		MOONIE HOLMEAD ST	+86 mV
ON OFF	-595 -484		LIGHT POLE CNR DITMAS/REMSON	-11 mV
ON OFF	-518 -457		LIGHT POLE DITMAS ST	-61 mV
ON OFF	-568 -556		LIGHT POLE 19 FULTON	-12 mV
ON OFF	-570 -570		FH DITMAS	0 mV
ON OFF	+49 +49		DITMAS ST PARK TAP	0 mV
ON OFF	-450 -430		TR E/S	-20 mV

COMPILED BY: **JIM STEW**

DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL SECTION

JIM

INTERFERENCE SURVEY RESULTS

JOB DESCRIPTION: - MT. GARRETT TO 3 MILE PLAIN  
HOLMEAD RD  
9-10-93

UNIT READING: - 500 mV ..... 1 cmH

READING		TEST POINT I.D.	LOCATION	SWING
ON	-318 mV		REC TOWER	-5 mV
OFF	-323 mV			
ON	-465 mV		FENCE (REC TOWER)	-2 mV
OFF	-463 mV			
ON	-465 mV		FH (REC TOWER)	-2 mV
OFF	-463 mV			
ON	-390 mV		VALVE (REC TOWER)	0 mV
OFF	-390 mV			
ON	-310 mV		WINDMILL PIPELINE	-3 mV
OFF	-315 mV			
ON	-310 mV		FH (CASSAVAN PASS)	0 mV
OFF	-315 mV			
ON	-486		HOLMEAD	0
OFF	-486		4/1000 PMX TAPS	
ON				
OFF				
ON				
OFF				
ON				
OFF				
ON				
OFF				

COMPILED BY: *M. M. ...*

**BRISBANE CITY COUNCIL**  
**DEPARTMENT OF WATER SUPPLY AND SEWERAGE**  
**MECHANICAL AND ELECTRICAL SECTION**

INTERFERENCE SURVEY RESULTS

JOB DESCRIPTION:- MT GRAVATT TO 8 MILE PLAINS  
 DITMAS ST  
 23-12-93

UNIT READING:- 500mV.....400h.....

	READING	TEST POINT I.D.	LOCATION	SWING
ON OFF	+440 mV +440 mV		VALVE (SERIES PILLAR BOX 1300)	0 mV
ON OFF	+400 mV +400 mV		FF (SERIES PILLAR BOX 1300)	0 mV
ON OFF	-130 mV -130 mV		WATER BOX (SERIES PILLAR BOX 1300)	0 mV
ON OFF	+171 mV +171 mV		N <sup>o</sup> 18	0 mV
ON OFF	+425 mV +425 mV		FF (1300)	0 mV
ON OFF	+343 mV +343 mV		N <sup>o</sup> 22	0 mV
ON OFF	-173 mV -173 mV		TAP IN PARK	
ON OFF				

COMPILED BY: *[Signature]*

BRISBANE CITY COUNCIL  
DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL SECTION

INTERFERENCE SURVEY RESULTS

JOB DESCRIPTION:- MT GRAVATT TO 8 MILE PLAINS

FULTON ST  
20-12-93

UNIT READING:- 500 mV.....40mA

	READING	TEST POINT I.D.	LOCATION	SWING
ON OFF	+415 mV +415 mV		VALVE (OUTSIDE N°19 - UNITS)	0 mV
ON OFF	+437 mV -437 mV		F.H (OUTSIDE N°18)	0 mV
ON OFF	+413 mV +413 mV		N°18	0 mV
ON OFF	-62 mV -62 mV		N°22	0 mV
ON OFF				
ON OFF	-450 -430		TRANS	-20 mV
ON OFF	-566 -556		WANT pole 19 Fulton	-12 mV
ON OFF	-518 -457		WANT pole DITMAS ST	-61 mV
ON OFF	-570 -570		F.H DITMAS	0
ON OFF	+49 +49		PANEL TAP	0
ON OFF	-595 -484		WANT pole CNR DITMAS / REMSON	-11
ON OFF	-912 -998		MON/26 1/20m	+86

COMPILED BY: *Murray [Signature]*

BRISBANE CITY COUNCIL  
DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL SECTION

INTERFERENCE SURVEY RESULTS

JOB DESCRIPTION: - MT GRAVATT TO 8 MILE PLAINS

TRAYON ST  
25-12-93

UNIT READING: - 500 mV ..... 40 mA

	READING	TEST POINT I.D.	LOCATION	SWING
ON OFF	+271 mV -271 mV		SEWER POLE N° 63319	0 mV
ON OFF	+116 mV -116 mV		F.H.	0 mV
ON OFF	-90 mV -90 mV		N° 32	0 mV
ON OFF	+246 mV +246 mV		N° 65	0 mV
ON OFF	+182 mV +182 mV		SEWER POLE N° 08617	0 mV
ON OFF	+98 mV +98 mV		F.H (OUTSIDE N° 69)	0 mV
ON OFF	+238 mV +238 mV		SEWER POLE N° (OUTSIDE N° 49)	0 mV
ON OFF				
ON OFF	-1.269 -1.269		AGL (SLIPPER) Common Pit TP 263	0
ON OFF	-536 -536		QEC Tower 1548	0
ON OFF	-572 -572		QEC 1547	0
ON OFF	-375 -422		QEC 1546	+47

COMPILED BY: *Murray McCracken*

**MEMORANDUM**

To	File No.
From	Date 9/12/93
Subject . . . MT. GRAVATT TO EIGHT MILE PLAINS . . . . . POLARIZED POTENTIALS (GRADING RINGS & EARTH CONNECTED)	

RECT SET	500 mV	40 mA
Zn TO PIPE	-17 mV <sub>an</sub>	+97 mV <sub>app</sub>
Zn TO PRO COUPON	-17 mV <sub>an</sub>	+104 mV <sub>app</sub>
Zn TO UNPRO COUPON	+521 mV <sub>an</sub>	+520 mV <sub>app</sub>
CuSO <sub>4</sub> TO PIPE	-1110 mV <sub>an</sub>	-940 mV <sub>app</sub>
CuSO <sub>4</sub> TO PRO COUPON	-1110 mV <sub>an</sub>	-951 mV <sub>app</sub>
CuSO <sub>4</sub> TO UNPRO COUPON	-578 mV <sub>an</sub>	-537 mV <sub>app</sub>
Zn TO CuSO <sub>4</sub>	-1093 mV <sub>an</sub>	-1058 mV <sub>app</sub>
TEST POINT N <sup>o</sup> 1		
PROTECTED - Zn TO PIPE	+11 mV <sub>an</sub>	+194 mV <sub>app</sub>
CuSO <sub>4</sub> TO PIPE	+1048 mV <sub>an</sub>	-841 mV <sub>app</sub>
Zn TO CuSO <sub>4</sub>	-1048 mV <sub>an</sub>	-1016 mV <sub>app</sub>
UNPROTECTED - Zn TO PIPE	+186 mV <sub>an</sub>	+179 mV <sub>app</sub>
CuSO <sub>4</sub> TO PIPE	-899 mV <sub>an</sub>	-904 mV <sub>app</sub>
Zn TO CuSO <sub>4</sub>	-1085 mV <sub>an</sub>	-1083 mV <sub>app</sub>
Zn TO PIPE	+156 mV <sub>an</sub>	+122 mV <sub>app</sub>
Zn TO PRO COUPON	+8 mV <sub>an</sub>	+204 mV <sub>app</sub>
Zn TO UNPRO COUPON	+527 mV <sub>an</sub>	+527 mV <sub>app</sub>
CuSO <sub>4</sub> TO PIPE	-897 mV <sub>an</sub>	-921 mV <sub>app</sub>
CuSO <sub>4</sub> TO PRO COUPON	-1049 mV <sub>an</sub>	-856 mV <sub>app</sub>
CuSO <sub>4</sub> TO UNPRO COUPON	-528 mV <sub>an</sub>	-513 mV <sub>app</sub>
Zn TO CuSO <sub>4</sub>	-1056 mV <sub>an</sub>	-1039 mV <sub>app</sub>
TEST POINT N <sup>o</sup> 2		
Zn TO PIPE	-125 mV <sub>an</sub>	+108 mV <sub>app</sub>
CuSO <sub>4</sub> TO PIPE	-1171 mV <sub>an</sub>	-961 mV <sub>app</sub>
Zn TO CuSO <sub>4</sub>	-1050 mV <sub>an</sub>	-1050 mV <sub>app</sub>

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MEMORANDUM

To	File No:
From	Date 9/12/93
Subject . . . MT. GRAVATT TO EIGHT MILE PLAINS POLARIZED POTENTIALS (GRADING RING & EARTHINGS CONNECTED)	

TEST POINT N<sup>o</sup> 4

PROTECTED - ZN TO PIPE	-87 mV <sub>an</sub>	+130 mV <sub>cp</sub>
CuSO <sub>4</sub> TO PIPE	-1142 mV <sub>an</sub>	-918 mV <sub>cp</sub>
Zn TO CuSO <sub>4</sub>	-1049 mV <sub>an</sub>	-1043 mV <sub>cp</sub>
UNPROTECTED - ZN TO PIPE	+325 mV <sub>an</sub>	+440 mV <sub>cp</sub>
CuSO <sub>4</sub> TO PIPE	-655 mV <sub>an</sub>	-478 mV <sub>cp</sub>
Zn TO CuSO <sub>4</sub>	-962 mV <sub>an</sub>	-955 mV <sub>cp</sub>

NOTE - Polarized potentials with Zn grading rings and Zn earths disconnected are unavailable at this stage due to water in the pits.

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MEMORANDUM

To	File No.
From	Date 29/11/13
Subject: MT. GRAVATT TO 8 MILE PLAINS ON POTENTIALS (NON POLARIZED)	

RECTIFIER SET AT 500 mV 40 mA

LOOP RESISTANCE

5 V	250 mA
10 V	500 mA
15 V	900 mA
20 V	1.2 A

ANODE CORRECT 40 mA

POTENTIALS:

Zn TO PIPE	+ 57 mV
Zn TO PRO COUPON	+ 57 mV
Zn TO UNPRO COUPON	- 553 mV
CuSO <sub>4</sub> TO PIPE	- 1017 mV
CuSO <sub>4</sub> TO PRO COUPON	- 1017 mV
CuSO <sub>4</sub> TO UNPRO COUPON	- 550 mV
CuSO <sub>4</sub> TO Zn	- 1079 mV

TEST POINT N°1

PROTECTED

Zn TO PIPE	+ 54 mV
CuSO <sub>4</sub> TO PIPE	- 1064 mV
CuSO <sub>4</sub> TO Zn	- 1118 mV

UNPROTECTED

Zn TO PIPE	+ 591 mV
CuSO <sub>4</sub> TO PIPE	- 437 mV
CuSO <sub>4</sub> TO Zn	- 1048 mV

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To	File No.
From	Date 29/11/93
Subject MT. GRAVATT TO EIGHT MILE PLAINS ON POTENTIALS (NON POLARIZED)	

TEST POINT N<sup>o</sup>1 CONT

## COUPON

Zn TO PIPE = 624 mV  
 Zn TO PRO COUPON = 3 mV  
 Zn TO UNPRO COUPON = 530 mV  
 CuSO<sub>4</sub> TO PIPE = 333 mV  
 CuSO<sub>4</sub> TO PRO COUPON = 950 mV  
 CuSO<sub>4</sub> TO UNPRO COUPON = 425 mV  
 CuSO<sub>4</sub> TO Zn = 957 mV

TEST POINT N<sup>o</sup>2

Zn TO PIPE = 36 mV  
 CuSO<sub>4</sub> TO PIPE = 1132 mV  
 CuSO<sub>4</sub> TO Zn = 1045 mV

TEST POINT N<sup>o</sup>4

## PROTECTED

Zn TO PIPE = 66 mV  
 CuSO<sub>4</sub> TO PIPE = 1120 mV  
 CuSO<sub>4</sub> TO Zn = 1052

## UNPROTECTED

Zn TO PIPE = 199 mV  
 CuSO<sub>4</sub> TO PIPE = 836 mV  
 CuSO<sub>4</sub> TO Zn = 1036

BRISBANE CITY COUNCIL  
MEMORANDUM

To	File No.
From	Date 3/11/93
Subject MT GRAVATT TO 8 MILE PLAINS	

SOIL RESISTIVITY AT RECTIFIER

2M (33x0.1) P=2πaR = 104.3 Ωm

5M (12x0.1) P=2πaR = 37.7 Ωm

ANODE TO GROUND RESISTANCE

5M (11x0.1) R=πaR = 11.5 Ω

NATURAL POTENTIALS

TEST POINT N°1

PROTECTED

CATH TO CATH RET	0.1 Ω
ZN TO PIPE	+573 mV
CuSO <sub>4</sub> TO PIPE	-488 mV
CuSO <sub>4</sub> TO ZN	-1058 mV

UNPROTECTED

CATH TO CATH RET	0.1 Ω
ZN TO PIPE	+569 mV
CuSO <sub>4</sub> TO PIPE	-473 mV
CuSO <sub>4</sub> TO ZN	-1041 mV

COUPON

ZN TO PIPE	+551 mV
ZN TO PRO COUPON	+597 mV
ZN TO UNPRO COUPON	+543 mV

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MEMORANDUM

To	File No.
From	Date 3/11/93
Subject MT. GRAVATT TO 8 MILE PLAINS	

## COUPON CONT

CUSO <sub>4</sub> TO PIPE	-573 mV
CUSO <sub>4</sub> TO PRO COUPON	-527 mV
CUSO <sub>4</sub> TO UNPRO COUPON	-580 mV
CUSO <sub>4</sub> TO ZN	-1121 mV
PIPE CATH TO PIPE CATH RET	0.1 Ω
COUPON CATH TO COUPON CATH RET	0.3 Ω

TEST POINT N<sup>o</sup> 2

ZN TO PIPE	+524 mV
CUSO <sub>4</sub> TO PIPE	-582 mV
CUSO <sub>4</sub> TO ZN	-1105 mV

TEST POINT N<sup>o</sup> 3 (RECTIFIER)

## COUPON

ZN TO PIPE	+510 mV
ZN TO PRO COUPON	+524 mV
ZN TO UNPRO COUPON	+538 mV
CUSO <sub>4</sub> TO PIPE	-550 mV
CUSO <sub>4</sub> TO PRO COUPON	-557 mV
CUSO <sub>4</sub> TO UNPRO COUPON	-523 mV
CUSO <sub>4</sub> TO ZN	-1057 mV
PIPE CATH TO PIPE CATH RET	0.1 Ω
COUPON CATH TO COUPON CATH RET	0.2 Ω

TEST POINT N<sup>o</sup> 4

## PROTECTED

ZN TO PIPE	+552 mV
CUSO <sub>4</sub> TO PIPE	-537 mV
CUSO <sub>4</sub> TO ZN	-1089 mV

BRISBANE CITY COUNCIL  
**MEMORANDUM**

To	File No.
From	Date 3 / 11 / 93
Subject MT. GRAVATT TO 8 MILE PLAINS	

TEST POINT N<sup>o</sup> 4 CONT

UNPROTECTED

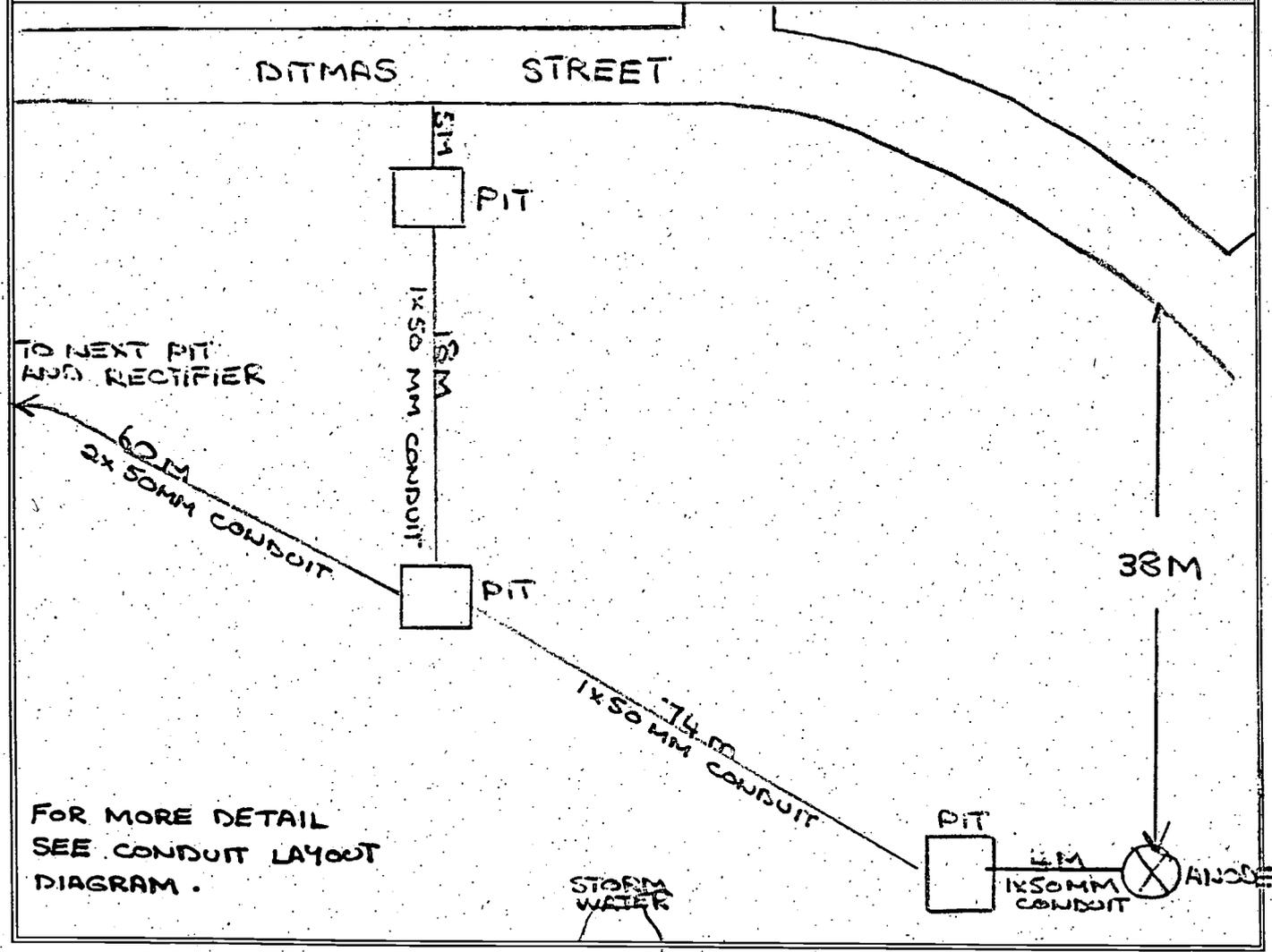
ZN TO PIPE	+539 mV
CUSO <sub>4</sub> TO PIPE	-520 mV
CUSO <sub>4</sub> TO ZN	-1059 mV

Brisbane City Council  
 Dept. W.S. & S.  
 Metropolitan Division  
 Eagle Farm Pump Station

Electrical Workshop

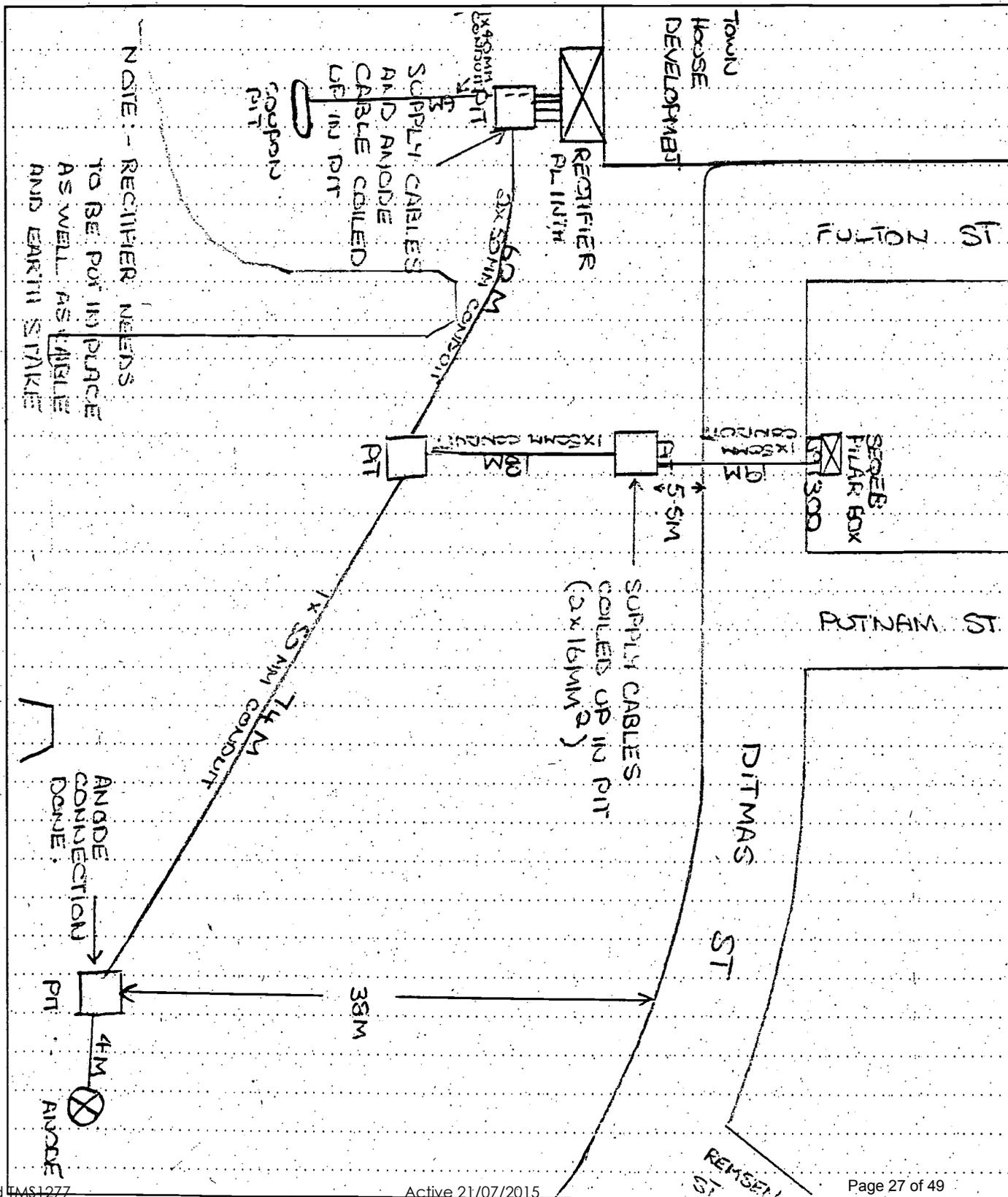
Cathodic Protection Anode Bed Testing

Date: 3 NOVEMBER 1993		Structure: MT GRAVATT TO 8 MILE PLAINS	
Anode material: SILICON IRON		Anode size/weight:	
Packaging: 2 M X 300 MM CANISTER		Burial: VERTICAL	
Depth: 5 M		Resistivity: 5 M (12 x 0.1) P = 270 Ω → 37.7 Ω/m	
Test Point type: 600 X 600 MM INGROUND PIT		Signage: P.K.	
Resistance to ground:			
Anode 1 11 x 0.1 = 1.1 Ω	Anode 2	Anode 3	Anode 4
Tested by: M. M. COENIGK <i>Murray McCormick</i>			
Locality Plan:			



BRISBANE CITY COUNCIL  
MEMORANDUM

To	File No.
From	ATTACHED DRAWING NO 1
	Date
7/10/93	
Subject CONDUIT LAYOUT PLAN	



BRISBANE CITY COUNCIL  
DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL SECTION

INTERFERENCE SURVEY RESULTS

JOB DESCRIPTION: - **FULTON ST**  
 19/1/94

UNIT READING: - 1. A 10.5 V.....

	READING	TEST POINT I.D.	LOCATION	SWING
ON OFF	-1269 -1269		AGL TP 263 CARAVAN PK	0 mV
ON OFF	-536 -536		DEC TOWER 1548	0 mV
ON OFF	-576 -576		" " 1547	0 mV
ON OFF	-375 -422		" " 1546	+47 mV
ON OFF	-486 -486		HOLMEAD ST CARAVAN PK TAPS	0 mV
ON OFF	-912 -998		MOONIE HOLMEAD ST	+86 mV
ON OFF	-595 -484		LIGHT POLE CNR DITMAS/REMSON	-11 mV
ON OFF	-518 -457		LIGHT POLE DITMAS ST	-61 mV
ON OFF	-568 -556		LIGHT POLE 19 FULTON	-12 mV
ON OFF	-570 -570		FH DITMAS	0 mV
ON OFF	+49 +49		DITMAS ST PARK TAP	0 mV
ON OFF	-450 -430		JR E/S	-20 mV

COMPILED BY: JIM STEELE

DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL SECTION

JIM.

INTERFERENCE SURVEY RESULTS

JOB DESCRIPTION: - MT BEAUMT TO 3 MILE PLAIN  
HOLLAND RD  
9-12-73

UNIT READING: - 500 mV ..... 40 mV

	READING	TEST POINT I.D.	LOCATION	SWING
ON OFF	-318 mV -323 mV		REC TOWER	+5 mV
ON OFF	-425 mV -463 mV		FENCE (REC TOWER)	-2 mV
ON OFF	-465 mV -463 mV		FH (REC TOWER)	-2 mV
ON OFF	-320 mV -320 mV		VALVE (REC TOWER)	0 mV
ON OFF	-310 mV -315 mV		MIDDLE PIPELINE	+3 mV
ON OFF	-318 mV -318 mV		FH (CASSAVAN PARK)	0 mV
ON OFF	-486 -486		Holland 470 mm pipe taps	0
ON OFF				

COMPILED BY: *M. J. [Signature]*

25  
25  
25

BRISBANE CITY COUNCIL  
DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL SECTION

INTERFERENCE SURVEY RESULTS

JOB DESCRIPTION:- MT GRAVATT TO 8 MILE PLAINS

DITMAS ST  
23-12-93

UNIT READING:- 500mV.....40mV

	READING	TEST POINT I.D.	LOCATION	SWING
ON OFF	+440 mV +440 mV		VALVE (SERIES PILLAR BOX 1300)	0 mV
ON OFF	+400 mV +400 mV		F.H. (SERIES PILLAR BOX 1300)	0 mV
ON OFF	-130 mV -130 mV		WATER BOX (SERIES PILLAR BOX 1300)	0 mV
ON OFF	+171 mV +171 mV		N <sup>o</sup> 18	0 mV
ON OFF	+423 mV +423 mV		F.H. (N <sup>o</sup> 22)	0 mV
ON OFF	-243 mV -243 mV		N <sup>o</sup> 22	0 mV
ON OFF	-173 mV -173 mV		TAP IN PARK	
ON OFF				

COMPILED BY: *[Signature]*

BRISBANE CITY COUNCIL  
DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL SECTION

INTERFERENCE SURVEY RESULTS

JOB DESCRIPTION: - MT GRAVATT TO 8 MILE PLAINS

FULTON ST

20-12-93

UNIT READING: - .500 mV.....40:1A...

	READING	TEST POINT I.D.	LOCATION	SWING
ON OFF	+415 mV -415 mV		VALVE (OUTSIDE N <sup>o</sup> 17 - UNITS)	0 mV
ON OFF	+437 mV -437 mV		F.H (OUTSIDE N <sup>o</sup> 18)	0 mV
ON OFF	+413 mV -413 mV		N <sup>o</sup> 18	0 mV
ON OFF	-62 mV -62 mV		N <sup>o</sup> 22	0 mV
ON OFF				
ON OFF	-456 -430		TRAILS	-20 mV
ON OFF	-568 -556		LANT PILE 19. FULTON	-12 mV
ON OFF	+518 -457		LANT PILE DITMAS ST	-61 mV
ON OFF	-570 -570		FH DITMAS	0
ON OFF	+49 +49		PARK TAP	0
ON OFF	-585 -484		LANT. PILE CNR DITMAS/REMSUN	-11
ON OFF	-912 -998		MOON/26 HOMERUN	+86

COMPILED BY: *Murray [Signature]*

BRISBANE CITY COUNCIL  
DEPARTMENT OF WATER SUPPLY AND SEWAGE  
MECHANICAL AND ELECTRICAL SECTION

INTERFERENCE SURVEY RESULTS

JOB DESCRIPTION:- MT GRAVATT TO 8 MILE PLAINS

TRUNK ST  
 23-12-93

UNIT READING:- 500mV...40mA

	READING	TEST POINT I.D.	LOCATION	SWING
ON OFF	+271 mV -271 mV		SEWEG POLE NO 63319	0 mV
ON OFF	+116 mV -116 mV		F.H.	0 mV
ON OFF	-90 mV -90 mV		N <sup>o</sup> 39	0 mV
ON OFF	+246 mV +246 mV		N <sup>o</sup> 85	0 mV
ON OFF	+132 mV +132 mV		SEWEG POLE NO 03617	0 mV
ON OFF	+98 mV +98 mV		F.H (OUTSIDE N <sup>o</sup> 69)	0 mV
ON OFF	+238 mV +238 mV		SEWEG POLE NO (OUTSIDE N <sup>o</sup> 49)	0 mV
ON OFF				
ON OFF	+1.269 -1.269		AGL (SLAPYBR) Common Pit TP 263	0
ON OFF	-536 -536		DEC Tower 1548	0
ON OFF	-572 -572		DEC 1547	0
ON OFF	-375 -422		DEC 1546	+47

COMPILED BY: *Misty M. ...*

BRISBANE CITY COUNCIL  
EAGLE FARM PUMP STATION  
CORROSION SECTION

TEST POINT N° 1

STANDARD CATHODIC PROTECTION TEST POINT DATA GATHERING

DATE: 28-10-93  
 TEST POINT TYPE: B

LOCATION: TRYON ST. MT GRAVATT  
 MAINS SIZE: 470mm.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE):  
 ZINC REFERENCE TO PIPE:  
 CuSO<sub>4</sub> REFERENCE TO PIPE:  
 ZINC TO CuSO<sub>4</sub>:

EARTH TESTING

PIN SPACING: 2M MEGGER READING: 27.3 x 0.1 RESISTIVITY: 27.3 Ωm = 34.3 Ωm  
 PIN SPACING: 5M MEGGER READING: 29 x 0.2 RESISTIVITY: 29 Ωm = 91.1 Ωm

SACRIFICIAL ANODE  
 (IF INSTALLED)

ANODE TYPE:  
 ANODE SIZE:  
 ANODE TO PIPE POTENTIAL:  
 ZINC REF TO PIPE:  
 (ANODE CONNECTED)

CuSO<sub>4</sub> REF TO PIPE:  
 (ANODE CONNECTED)

SACRIFICIAL ANODE CURRENT:

BLEED RESISTOR SIZE:  
 (IF INSTALLED)

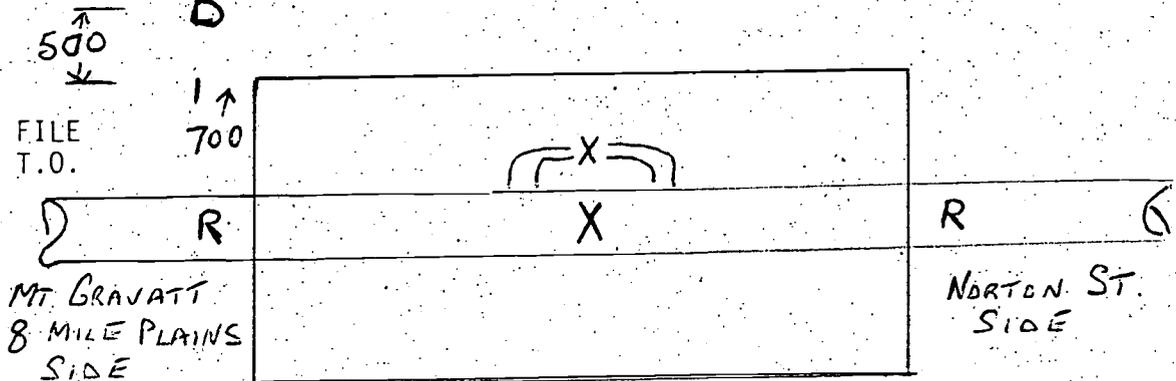
INSTALLED BY: L. Grewers.

D = DEFECT.  
 R = ZN REF.

COMMENTS:

100 x 100 mm defect installed

1 COPY TO FILE  
 1 COPY TO T.O.



DEPARTMENT OF WATER SUPPLY AND SEWERAGE  
MECHANICAL AND ELECTRICAL BRANCH  
METROPOLITAN DIVISION  
EAGLE FARM PUMPING STATION

ELECTRICIAL WORKSHOP

INSULATED JOINT TESTING DETAILS:

DATE 28-10-93

DESCRIPTION

MAINS DETAILS:- MT. GRAVATT TO 8 MILE PLAINS  
 LOCATIONS:- TRYON ST. MT. GRAVATT  
 SIZE:- 470 MM  
 MATERIAL:- MILD STEEL  
 COATING:-  
 NUMBER:-

IN GROUND TESTING

BOLT TO FLANGE RESISTANCE:-  
 NUMBER OF BOLT:-  
 FLANGE TO FLANGE RESISTANCE:-  
 INSULATION CHECKER MODEL 702:-  
 POTENTIAL DIFFERENCE TO REFERENCE CELL  
 PROTECTED SIDE:-  
 UNPROTECTED SIDE:-

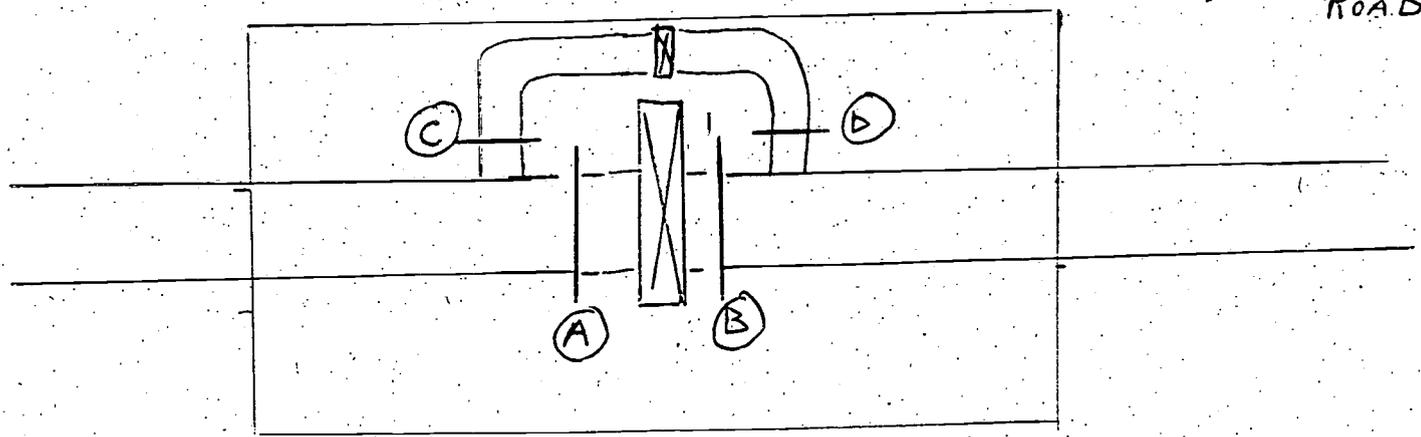
ABOVE TESTING

BOLT TO FLANGE RESISTANCE:-	A	B	C	D
NUMBER OF BOLTS:-	12	12	4	4
FLANGE TO FLANGE RESISTANCE:-	10Ω	50Ω	>200Ω	>200Ω

COMMENTS

TESTED BY *A. Greaves*

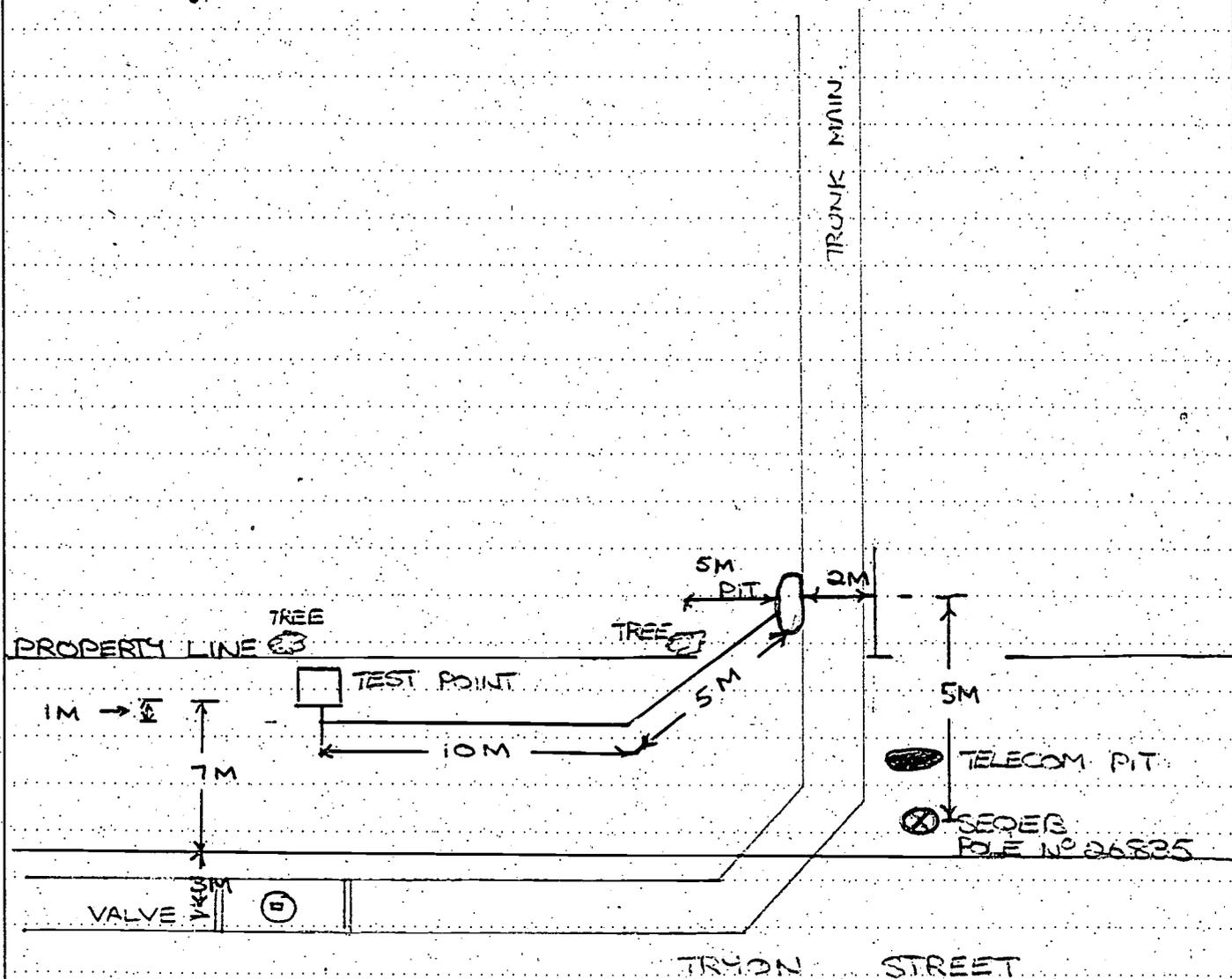
→ TO MT. GRAVATT  
CAPALBA  
ROAD.



BRISBANE CITY COUNCIL  
MEMORANDUM

To	File No.
From	Date 16/07/93
Subject TEST POINT N <sup>o</sup> 1 LOCATION PLAN	

cables to either side of the valve are not installed because valve pit is yet to be constructed.



BRISBANE CITY COUNCIL  
EAGLE FARM PUMP STATION  
CORROSION SECTION

STANDARD CATHODIC PROTECTION TEST POINT DATA GATHERING TEST POINT: N<sup>o</sup> 2

DATE: 25-05-98  
TEST POINT TYPE: B

LOCATION: NEWHAM RD / TRYON ST  
MAINS SIZE: 500 MM

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE): 0.1  $\Omega$   
ZINC REFERENCE TO PIPE: 414 mV  
CuSO<sub>4</sub> REFERENCE TO PIPE: -630 mV  
ZINC TO CuSO<sub>4</sub>: -1048 mV

EARTH TESTING

PIN SPACING: 2m MEGGER READING: 7.29 RESISTIVITY: 2TIAR = 916  $\Omega$ m  
PIN SPACING: 3m MEGGER READING: 6.53 RESISTIVITY: 2TIAR = 123  $\Omega$ m

SACRIFICIAL ANODE  
(IF INSTALLED)

ANODE TYPE:  
ANODE SIZE:  
ANODE TO PIPE POTENTIAL:  
ZINC REF TO PIPE:  
(ANODE CONNECTED)

CuSO<sub>4</sub> REF TO PIPE:  
(ANODE CONNECTED)

SACRIFICIAL ANODE CURRENT:

BLEED RESISTOR SIZE:  
(IF INSTALLED)

INSTALLED BY: MURRY M<sup>C</sup> CORMICK

COMMENTS: 1. CuSO<sub>4</sub> LOCATED NEXT TO KERB FOR TEST  
2. EARTH RESISTIVITY TEST LOCATED IN FOOT PATH  
NEXT TO KERB, WITH THE YELLOW DIGITAL METER

1 COPY TO FILE  
1 COPY TO T.O.

BRISBANE CITY COUNCIL  
EAGLE FARM PUMP STATION  
CORROSION SECTION

STANDARD CATHODIC PROTECTION TEST POINT DATA GATHERING

TEST POINT N<sup>o</sup> 3

DATE: 3-11-93  
TEST POINT TYPE: COUPON

LOCATION: FULTON & MITMAS STS  
MAINS SIZE: 500 MM

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE): 0.15Ω  
ZINC REFERENCE TO PIPE: +510 mV  
CuSO<sub>4</sub> REFERENCE TO PIPE: -550 mV  
ZINC TO CuSO<sub>4</sub>: -1057 mV

EARTH TESTING

PIN SPACING: 2 M      MEGGER READING: 83 x 0.1      RESISTIVITY: 212 Ωm = 104.3 Ωm  
PIN SPACING: 5 M      MEGGER READING: 12 x 0.1      RESISTIVITY: 212 Ωm = 37.7 Ωm

SACRIFICIAL ANODE  
(IF INSTALLED)

ANODE TYPE:  
ANODE SIZE:  
ANODE TO PIPE POTENTIAL:  
ZINC REF TO PIPE:  
(ANODE CONNECTED)

CuSO<sub>4</sub> REF TO PIPE:  
(ANODE CONNECTED)

SACRIFICIAL ANODE CURRENT:

BLEED RESISTOR SIZE:  
(IF INSTALLED)

INSTALLED BY: P. SMYTH

TESTED BY: M. M<sup>c</sup> CORMICK

*Murray McCormick*

COMMENTS:

1 COPY TO FILE  
1 COPY TO T.O.

BRISBANE CITY COUNCIL  
EAGLE FARM PUMP STATION  
CORROSION SECTION

STANDARD CATHODIC PROTECTION TEST POINT DATA GATHERING

TEST POINT N<sup>o</sup> 4

DATE: 10-11-93  
TEST POINT TYPE: INSULATED FLANGE

LOCATION: HOLMEAD RD  
MAINS SIZE: 500MM

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE):  
ZINC REFERENCE TO PIPE:  
CuSO<sub>4</sub> REFERENCE TO PIPE:  
ZINC TO CuSO<sub>4</sub>:

PROTECTED  
0.1Ω  
+ 536mV  
- 563mV  
- 1095mV

UNPROTECTED  
0.1Ω  
+ 482mV  
- 589mV  
- 1070mV

EARTH TESTING

PIN SPACING: 2M

MEGGER READING: 38 x 0.1 RESISTIVITY: P. STAR → 93.4Ωm

PIN SPACING: 5M

MEGGER READING: 26 x 0.1 RESISTIVITY: P. STAR → 81.7Ωm

SACRIFICIAL ANODE  
(IF INSTALLED)

ANODE TYPE:  
ANODE SIZE:  
ANODE TO PIPE POTENTIAL:  
ZINC REF TO PIPE:  
(ANODE CONNECTED)

CuSO<sub>4</sub> REF TO PIPE:  
(ANODE CONNECTED)

SACRIFICIAL ANODE CURRENT:

BLEED RESISTOR SIZE:  
(IF INSTALLED)

INSTALLED BY: M. M<sup>c</sup>CORMICK

COMMENTS: ORIGINAL TEST POINT LOCATED NEAR KEAD IN A PIT  
WAS INSTALLED BY P. SMYTH. CABLES WERE EXTENDED  
AND AN ABOVE GROUND TEST POINT INSTALLED ON FENCE  
ALINEMENT

Mussey M<sup>c</sup>Cormick

1 COPY TO FILE  
1 COPY TO T.O.

BRISBANE CITY COUNCIL  
MEMORANDUM

To	File No.
From	Date 23/11/93
Subject MT GRAVATT TO 8 MILE PLAINS TEST POINT N <sup>o</sup> 4 HOLMEAD RD.	

GRADING RING TO EARTH

SPACING :- SOFT READING 2.1 x 0.1  
RESISTANCE = 2.1 Ω

PROTECTED

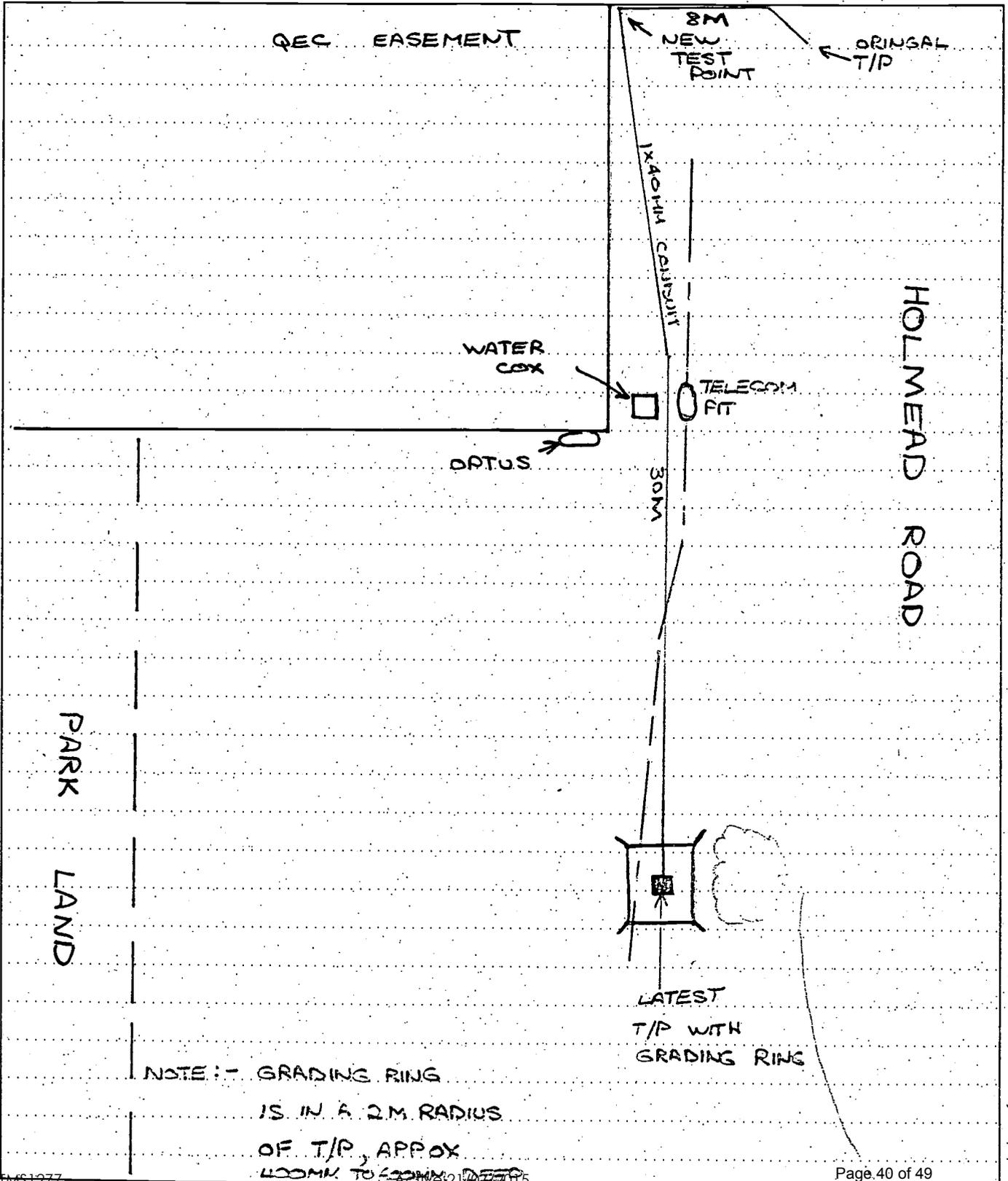
CATH TO CATH RET	0.2 Ω
ZN TO PIPE	+501 mV
CUSO <sub>4</sub> TO PIPE	-556 mV
CUSO <sub>4</sub> TO ZN	-1059 mV

UNPROTECTED

CATH TO CATH RET	0.2 Ω
ZN TO PIPE	+428 mV
CUSO <sub>4</sub> TO PIPE	-594 mV
CUSO <sub>4</sub> TO ZN	-1021 mV

BRISBANE CITY COUNCIL  
MEMORANDUM

To	File No.
From	Date 23/11/93
Subject MT GRAVATT TO 8 MILE PLAINS TEST POINT N <sup>o</sup> 4	



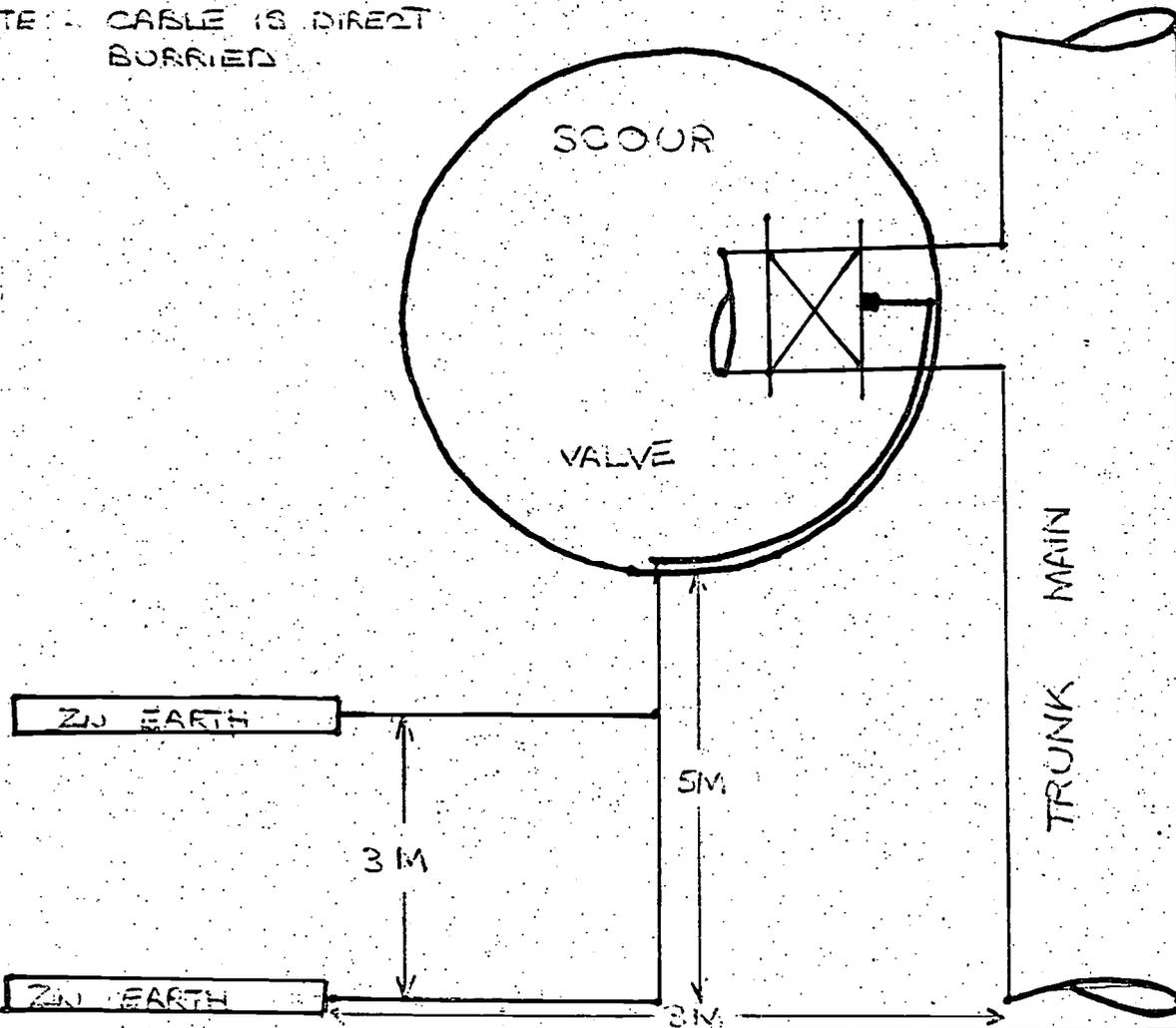
Brisbane City Council  
 Dept. W.S. & S.  
 Metropolitan Division  
 Eagle Farm Pump Station

Electrical Workshop

Cathodic Protection Anode Bed Testing

Date: 30-11-93	Structure: MT GRAVATT TO 8 MILE PLAINS		
Anode material: ZINC	Anode size/weight: 1500MM x 75MM x 75MM		
Packaging: BENTONITE	Burial: HORIZONTAL		
Depth: 1.5 M	Resistivity: 2M 11 x 0.01 2TAP 1.38 Ωm	5M 12 x 0.01 2TAP 2.51 Ωm	
Test Point type: EARTHING	Signage: CONNECTED TO CABLE		
Resistance to ground:			
Anode 1 7.99 Ω	Anode 2 7.99 Ω	Anode 3	Anode 4
Tested by: <i>Murray Macdonald</i>			Anode 5
Locality Plan:			

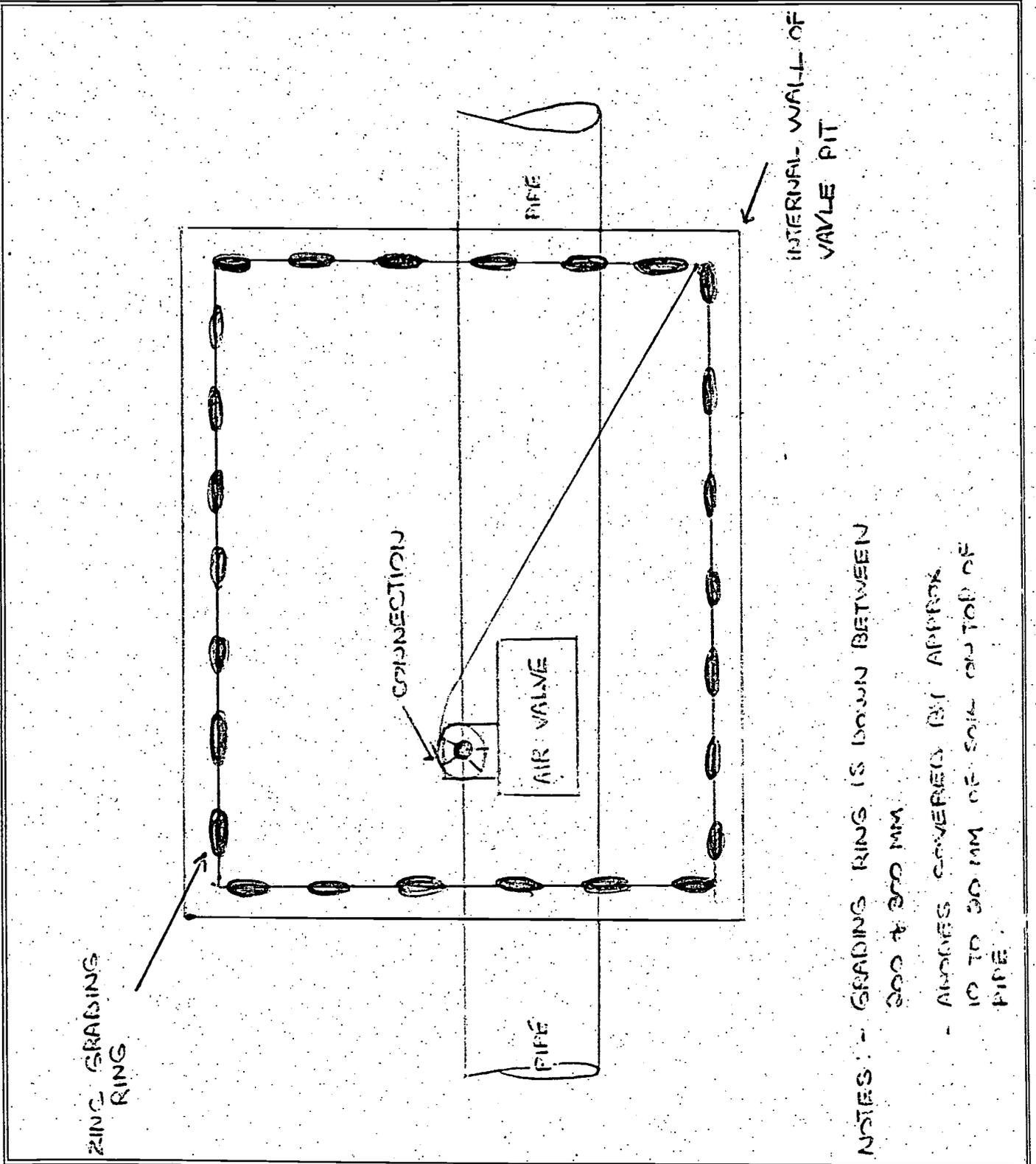
NOTE - CABLE IS DIRECT BURIED



Brisbane City Council  
Dept of Water Supply and Sewerage  
Eagle Farm Pump Station  
Electrical Workshop

Date: 25-11-93

Site Plan for: AIR VALVE GRADING RING, HOLMEAD RD EIGHT MILE PLAINS  
MT GRAVATT TO EIGHT MILE PLAINS



BRISBANE CITY COUNCIL  
MEMORANDUM

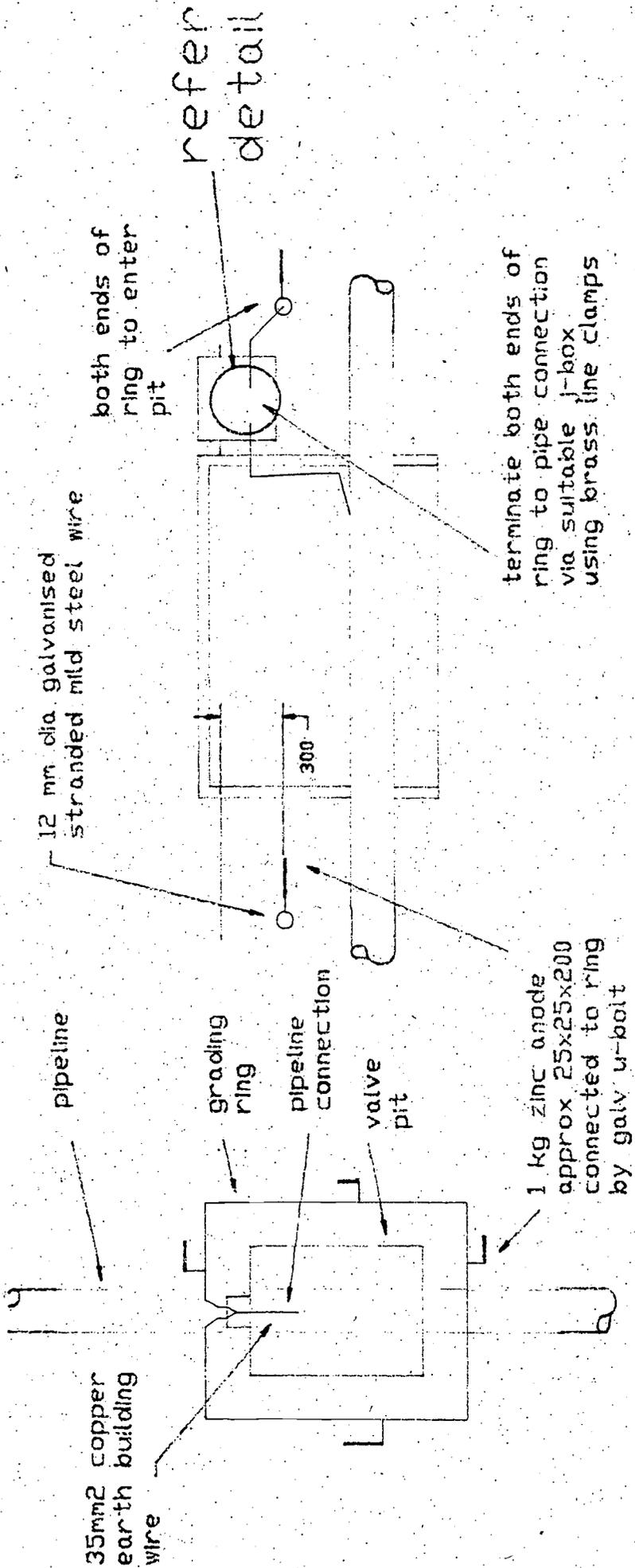
To	File No.
From	Date 31/11/93
Subject: MT GRAVATT TO 8 MILE PLAINS AIR VALVE HOLMEAD ROAD	

AIR VALVE GRADING RING TO EARTH

SPACING - 54 FT      READING - 479.0 Ω

RESISTANCE 47.9 Ω

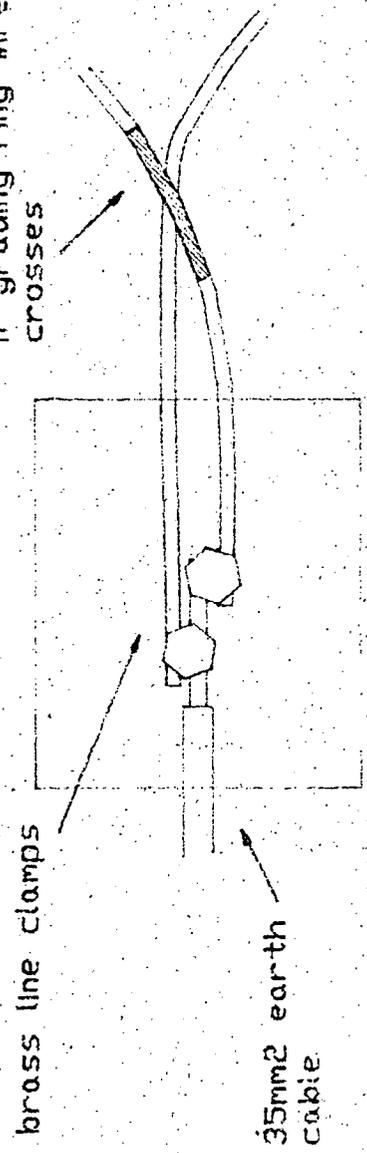
- NOTE :-
- 1) Reading not accurate due to A.C interference possibly caused by pipes or DEE transmission lines
  - 2) The soil within the air valve pit was sandstone, clay & coarse sand
  - 3) The air valve is insulated from the trunk main



elevation

heat shrink sleeve if grading ring wire crosses

plan



detail

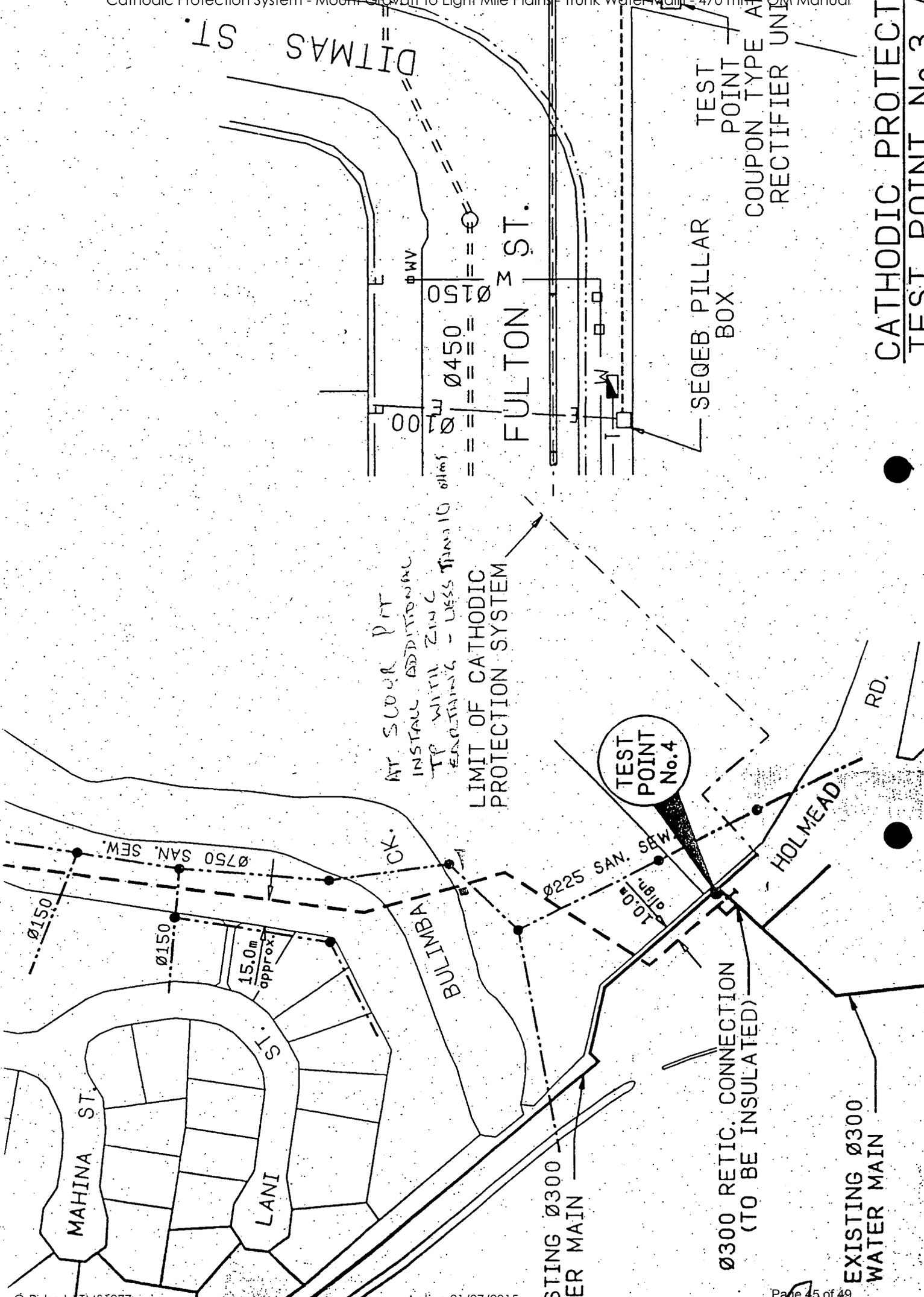
both ends of ring to enter pit

refer detail

terminate both ends of ring to pipe connection via suitable J-box using brass line clamps

NOTE: All test point and reference cabling to run to above ground test point via the cable pit

SKETCH 1



CATHODIC PROTECTION  
TEST POINT No.3 A

AT SLOUR PIT  
INSTALL ADDITIONAL  
TP WITH ZINC  
ANODES - LESS THAN 10  
METERS  
LIMIT OF CATHODIC  
PROTECTION SYSTEM

TEST  
POINT  
No.4

TEST  
POINT  
COUPON TYPE ANODE  
RECTIFIER UNIT

SEQUEB PILLAR  
BOX

FULTON ST.

DITMAS ST.

MAHINA ST.

LANI ST.

CR.

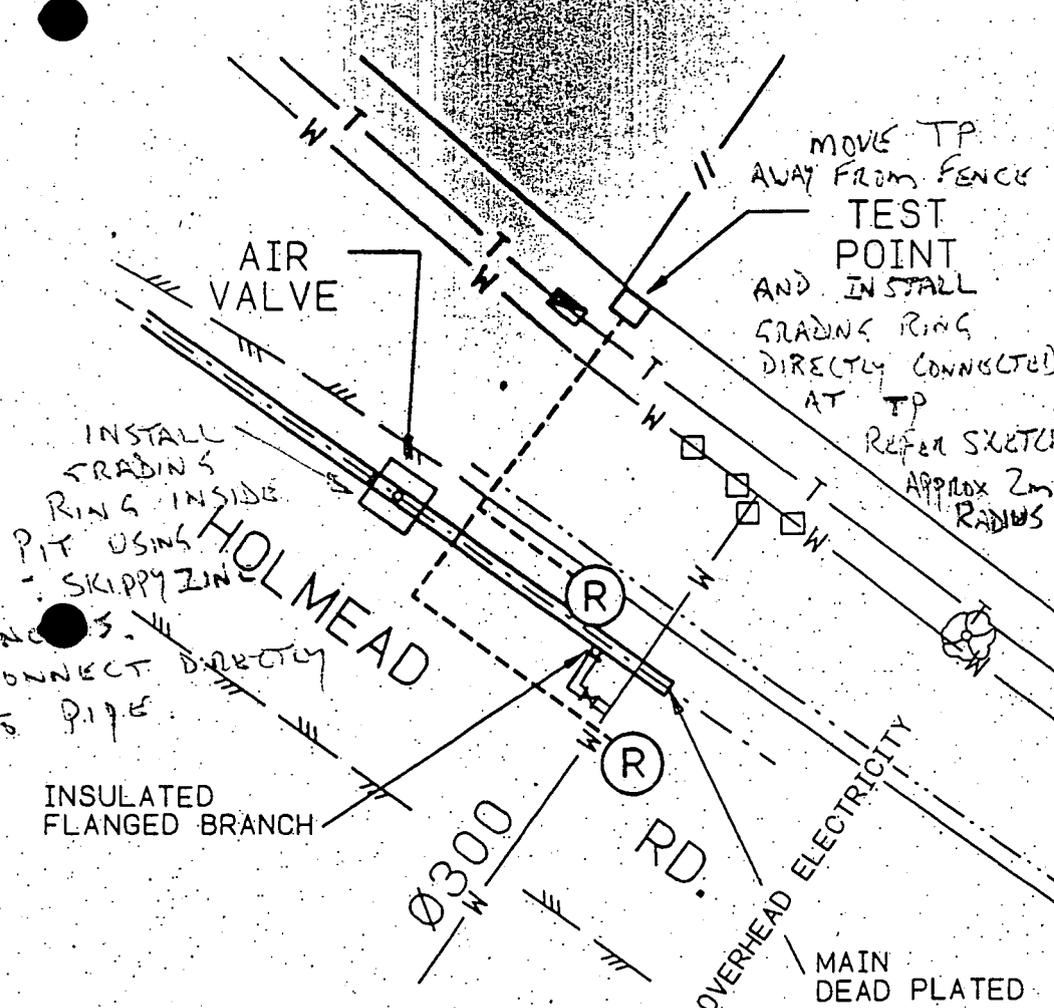
BULIMBA

EXISTING Ø300  
WATER MAIN

Ø300 RETIC. CONNECTION  
(TO BE INSULATED)

EXISTING Ø300  
WATER MAIN

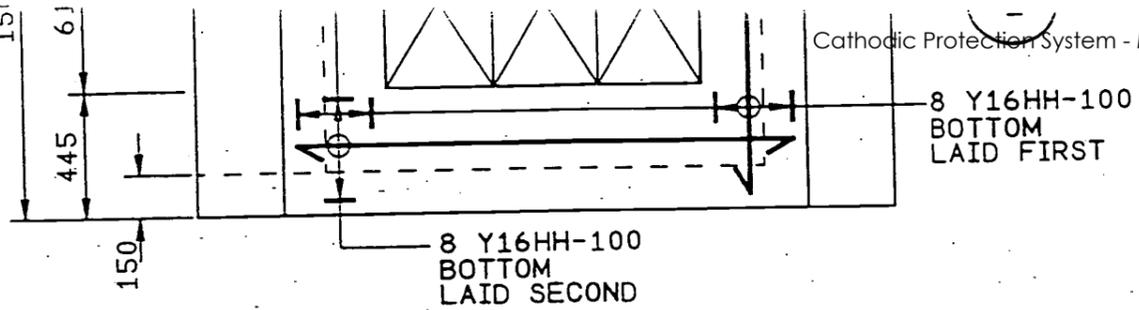
RD.



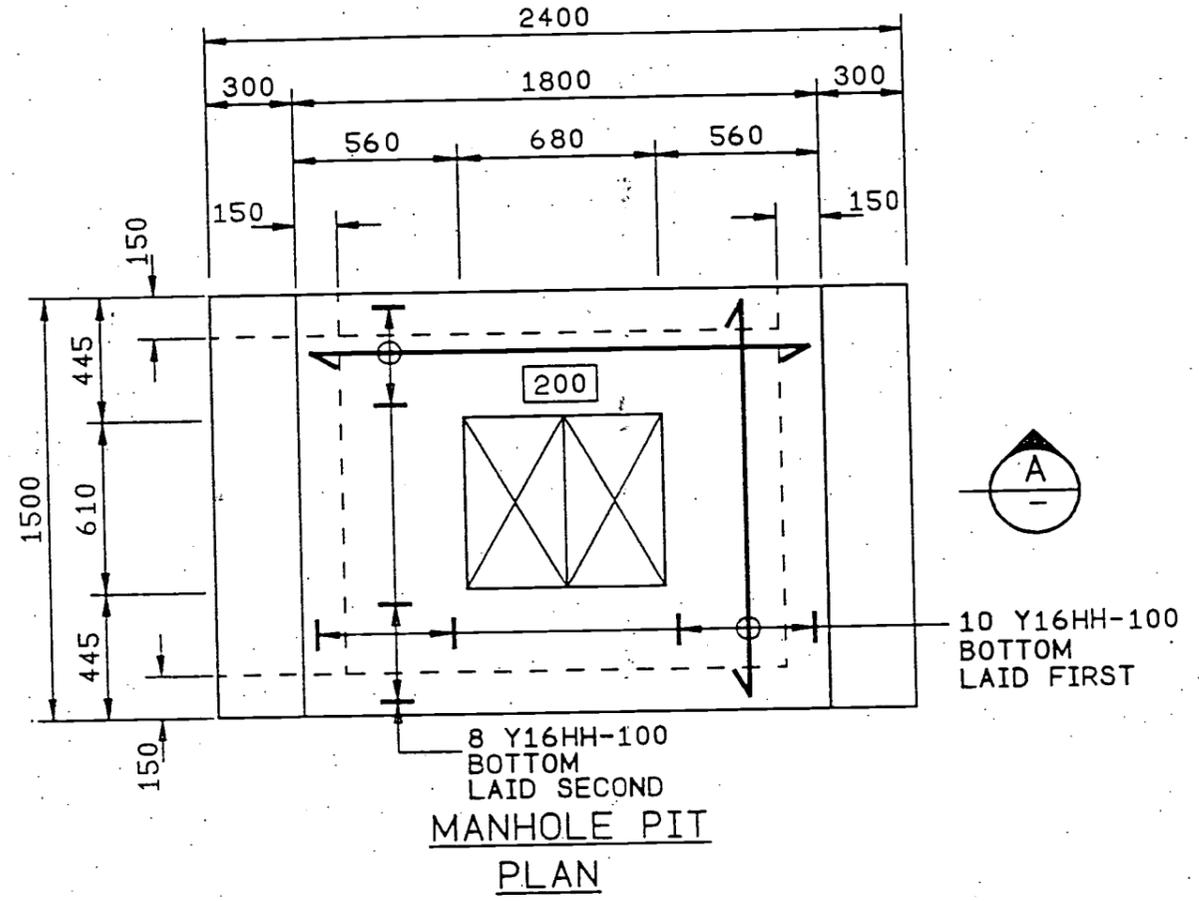
**CATHODIC PROTECTION  
TEST POINT No.4**  
SCALE 1:250

A 5.93		HISTORICAL RECORD	
NO DATE		AMENDMENT/ISSUE TO/	
<b>AMENDMENT &amp; ISSUE</b>			
MANAGER		DREC & DE	
DATE		DATE	
DIRECTOR OF CONSTRUCTION		DIRECTOR OF M. & E. SERVICE	
DATE		DATE	
DESIGN	J.S.	12.5.93	ENGIN IN CH
DRAWN	J.N.FIELD	12.5.93	SUPER ENGIN
TRACED			SENIOR ENGIN
CHK'D.			FIELD BOOK
<b>A.H DATUM</b>			SURV:
CAD FILE N°		66C004A	
 <b>BRISBANE CITY</b> DEPARTMENT SUPPLY & SE PLANNING & DES			
PROJECT FULTON ST. CATHODIC PROTECTI UPPER MT. GRAVATT EIGHT MILE PLAINS			
TITLE 470 DIA. MSCL WATER TRUNK MAIN			
SCALE AS SHOWN		N° 1	
DRAWING N°		486/6/6-UF1C0	

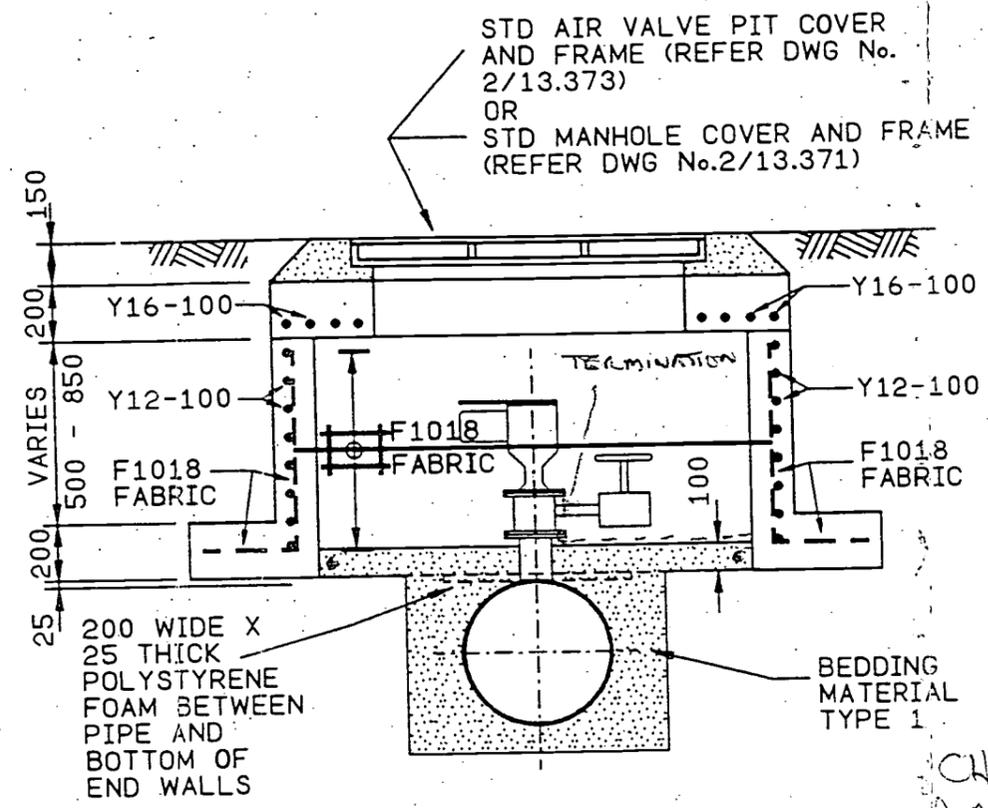
WALL CORNER DETAIL  
TYPICAL



AIR VALVE PIT  
PLAN



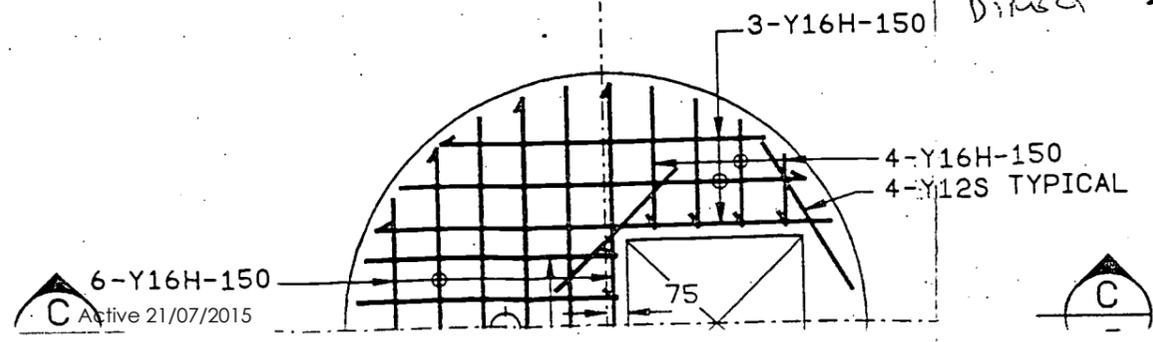
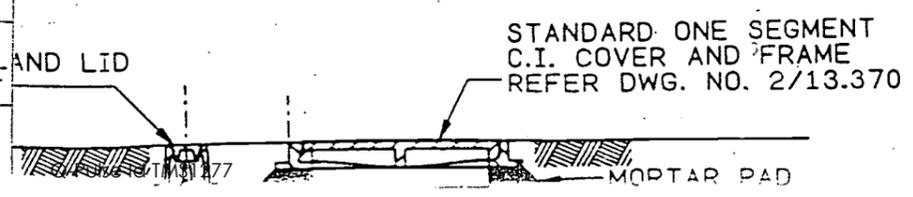
MANHOLE PIT  
PLAN



SECTIONAL ELEVATION (A)

CONCRETE STRENGTH :  $f'_c = N32MPa$ .  
REINFORCEMENT COVER : 40mm

AIR VALVE PIT AND MANHOLE PIT DETAILS  
SCALE 1 : 25



CHECK HOLSTEAD RD  
AIR VALVE TO SEE  
IF BOTTOM IS  
GRAVEL/SAND OR  
CONCRETE.  
IF GRAVEL/SAND  
INSTALL SKIPPY ZINC  
GRADING RINGS INSIDE  
PIT IN GRAVEL/SAND  
AND TERMINATE  
DIRECT TO PIPE

65 NO SUBSTITUTE  
USED WITHOUT  
SUPERINTENDE  
66 THE CONTRACTOR  
FULLY CONVEY  
SERVICES AND  
ADJACENT TO  
AND SHALL BE  
DAMAGE TO T  
STRUCTURES D  
CONTRACT.

67 ALL WORK SH  
COMPLIANCE  
WORKPLACE H  
REGULATIONS

68 FOR DETAILS  
TO THE GEOT  
CONTAINED IN  
DOCUMENTATI

69 MANHOLE COV  
FOR ALL VAL  
VALVE PITS.  
SHALL BE SU

PIPEWORK

P1 INSULATED B  
SHALL BE US  
BRANCHES IN  
CONNECTIONS

P2 UNLESS OTH  
BLOCKS SHA

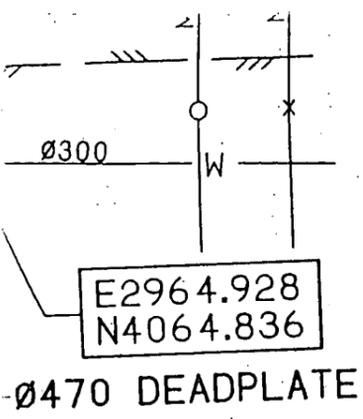
P3 EXTERNAL CO  
REMOVED WH  
SURROUNDED

P4 NO REINFORC  
OR MAKE CO

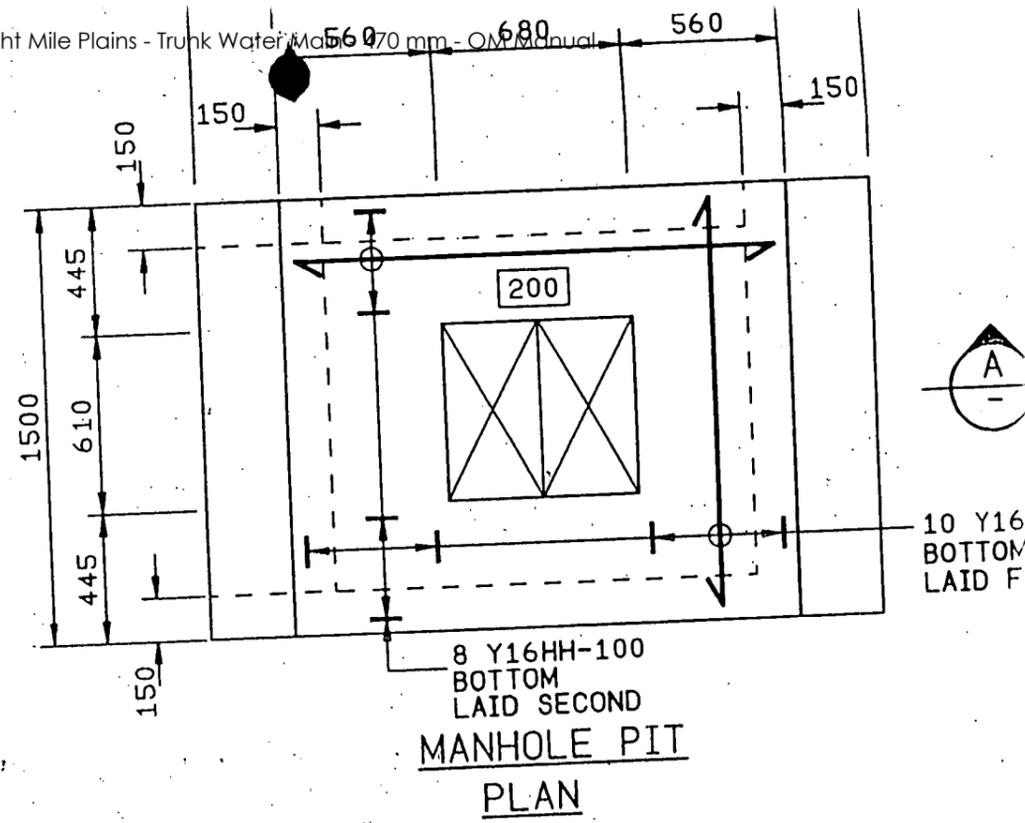
P5 THE BCC'S M  
BRANCH TO  
BACKFILLING  
PROTECTION  
INSTALLED.

SCOUR NOTES

S1 WHERE DEPT  
2400. USE S  
REFER DWG.  
OF PIT IS G  
STANDARD L  
3018/4000.



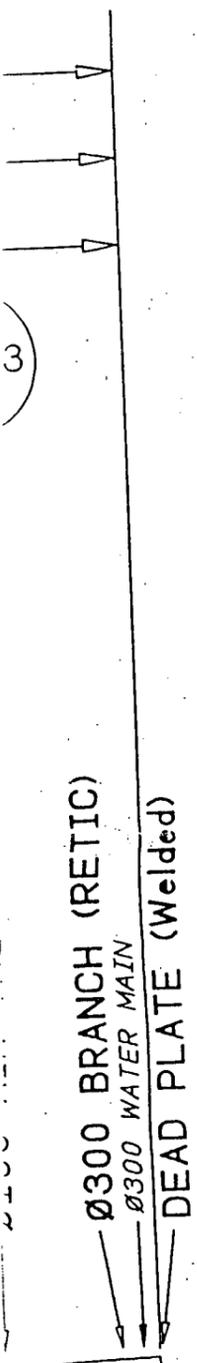
Ø470 DEADPLATE



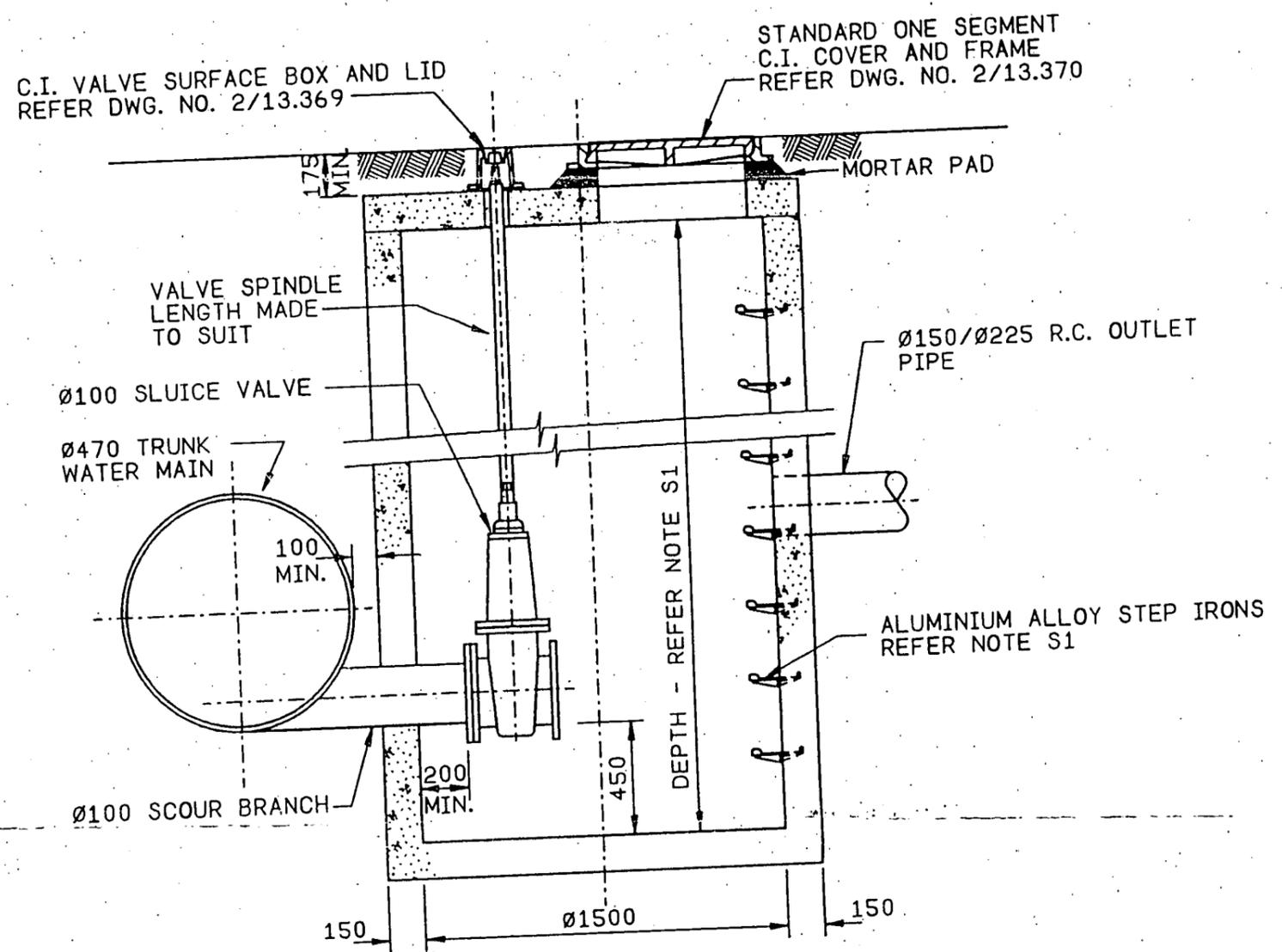
8 Y16HH-100  
BOTTOM  
LAID SECOND  
**MANHOLE PIT**  
PLAN

CONCRETE STEEL  
REINFORCEMENT

**AIR VALVE PIT AND**  
SCALE



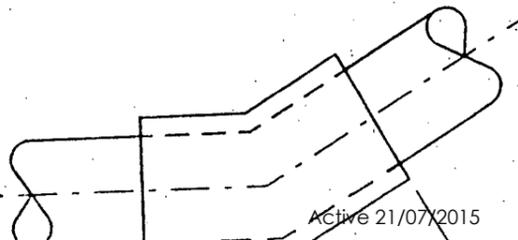
B & P WITH  
Ø100 FL.  
A.V. BRANCH  
& Ø300 FL.  
BRANCH  
No. 173



**TYPICAL SECTION**

**SCOUR PIT DE**  
SCALE 1:25

8	29.305	1.863	2.229
4	29.305		



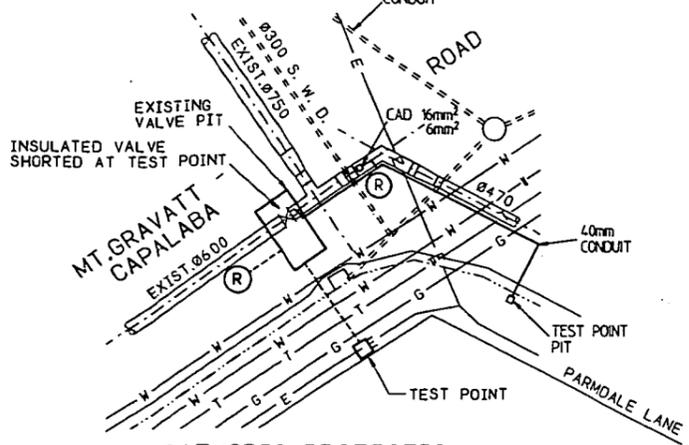
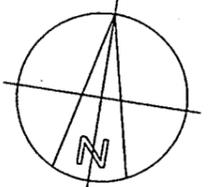
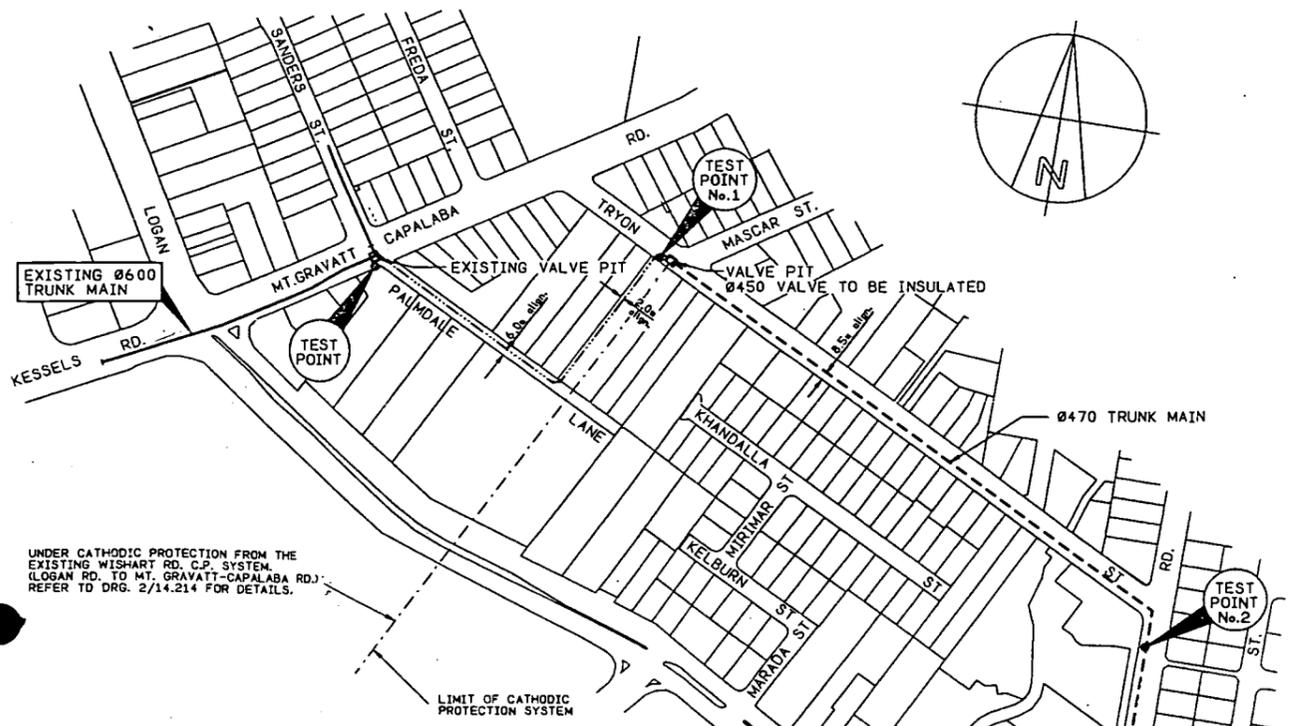
Active 21/07/2015

ANCHOR BLOCK TABLE			
GRADE N20 CONCRETE (UNREINFORCED)			
PIPE No.	BEND ANGLE	LENGTH(L)m	VC CO

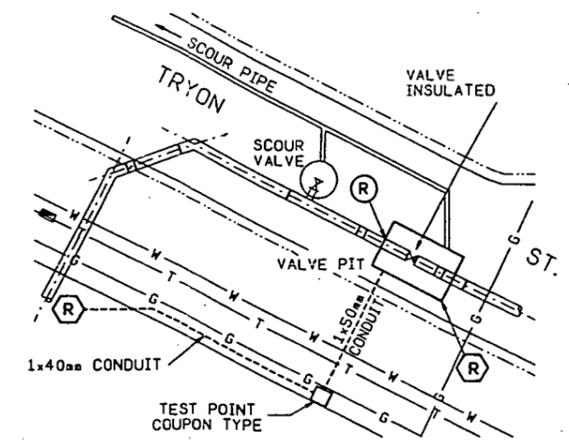
- REFER DRAWINGS - 486/1/6-WT0010 TO 486/1/6-WT0010 FOR TRUNK MAIN DETAILS.
- ALL SCOUR VALVES, AIR VALVES & FLANGED BRANCHES HAVE INSULATING BOLTS INSTALLED.

LEGEND

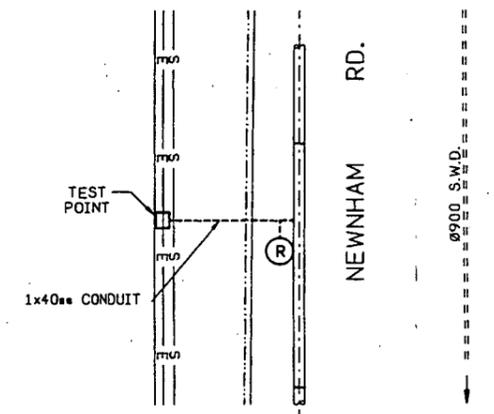
- (R) REFERENCE ELECTRODE
- (R) COUPON TYPE REFERENCE



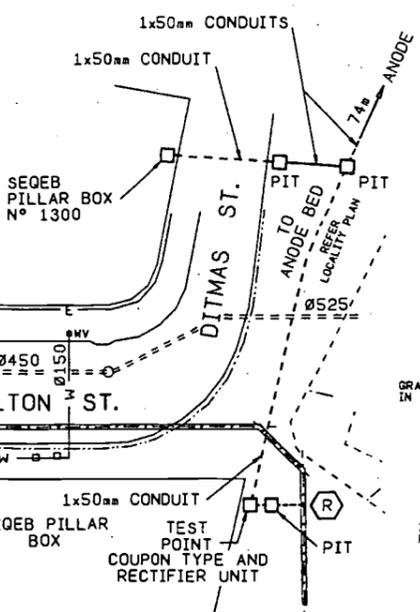
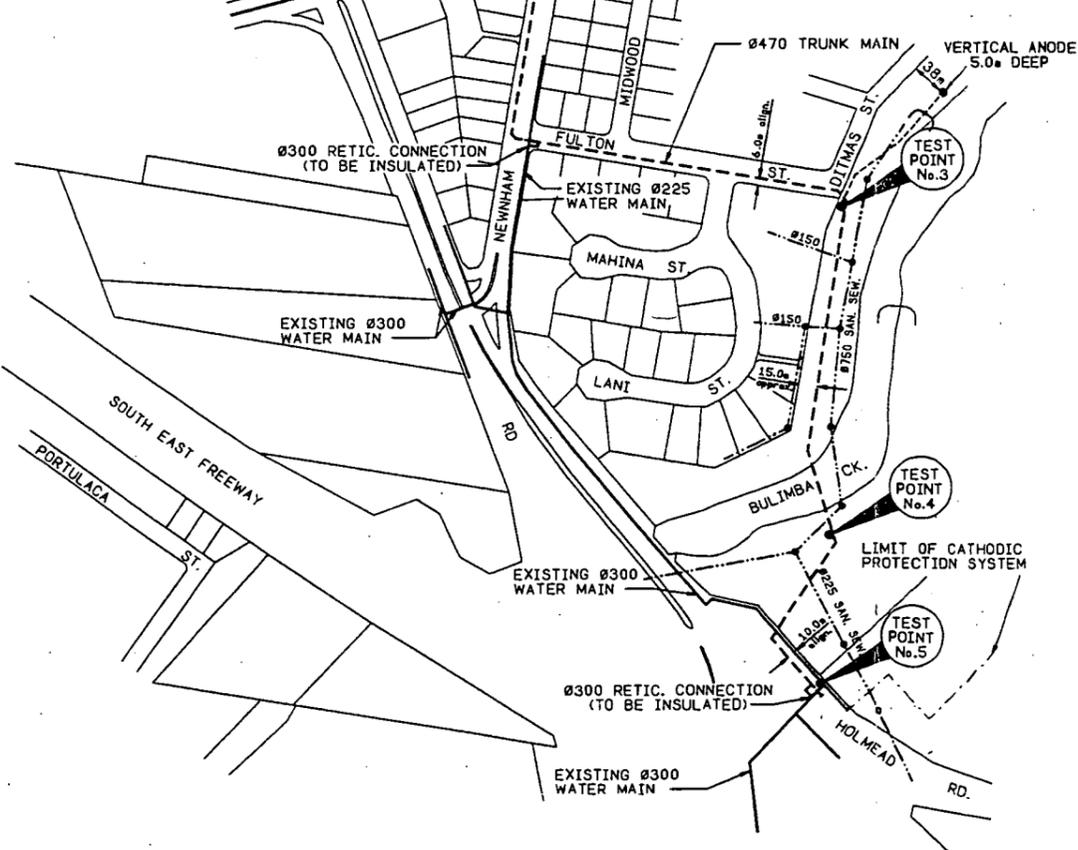
CATHODIC PROTECTION TEST POINT No.1  
SCALE 1:150



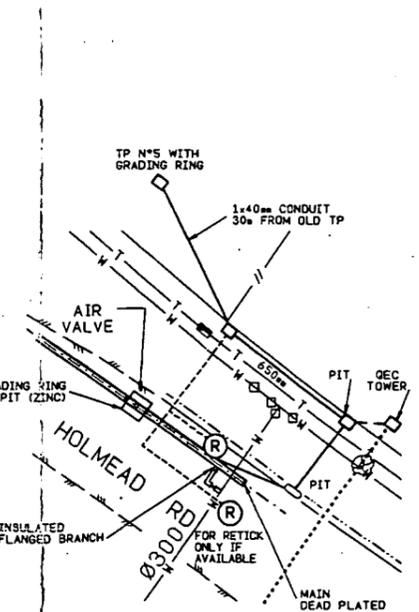
CATHODIC PROTECTION TEST POINT No.1  
SCALE 1:150



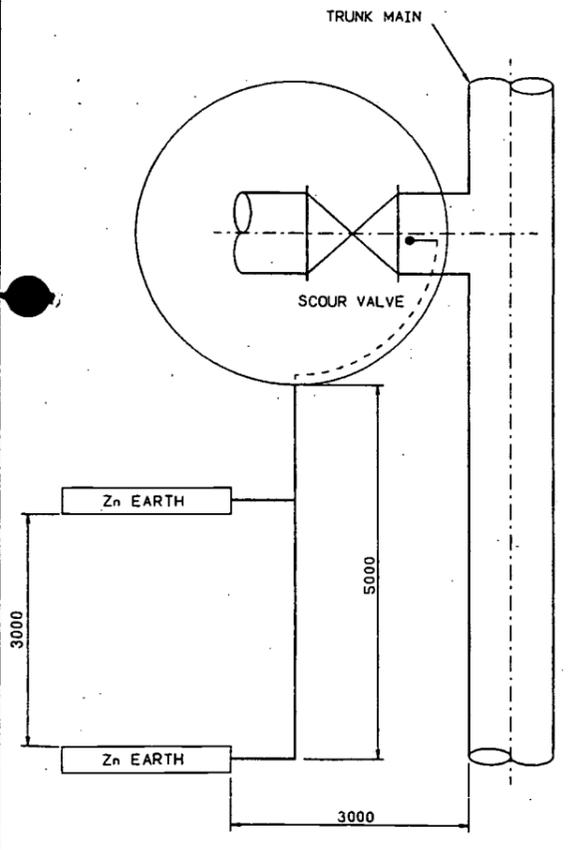
CATHODIC PROTECTION TEST POINT No.2  
SCALE 1:150



CATHODIC PROTECTION TEST POINT No.3 AND RECTIFIER UNIT  
SCALE 1:350



CATHODIC PROTECTION TEST POINT No.5  
SCALE 1:250



CATHODIC PROTECTION TEST POINT No.4  
N.T.S.

LOCALITY PLAN  
SCALE 1:2500

UNDER CATHODIC PROTECTION FROM THE EXISTING WISHART RD. C.P. SYSTEM. (LOGAN RD. TO MT. GRAVATT-CAPALABA RD.) REFER TO DRG. 2/14.214 FOR DETAILS.

LIMIT OF CATHODIC PROTECTION SYSTEM

01.12.93	HISTORICAL RECORD	J.F.
INDICATE AMENDMENT/ISSUE TO/ISSUE FOR INITIALS		

AMENDMENT & ISSUE REGISTER

MANAGER	DATE	DIRECTOR OF PLANNING & DESIGN	DATE
DIRECTOR OF CONSTRUCTION		DIRECTOR OF M&E SERVICES	
		DIRECTOR OF SEWAGE OPERATIONS/WS DISTRIBUTION	
DESIGN	J.S.	25.93	ENGINEER IN CHARGE
DRAWN	JANFIELD	23.12.93	SUPERVISING ENGINEER
TRACED			SENIOR ENGINEER
CHKD.			ENGINEER
A/H DATUM		CLIENT	
CAD FILE N°		680004-	



PROJECT  
FULTON ST.  
CATHODIC PROTECTION DETAILS  
UPPER MT. GRAVATT TO  
EIGHT MILE PLAINS

TITLE  
470 DIA. MSCL  
WATER TRUNK MAIN C.P. DETAILS

SCALE AS SHOWN | N° 1 OF 1 SHEETS  
DRAWING N° 486/6/6-UF10004E | AMEND 0  
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