□ Electrical □ Mechanical □ Water Meters
5 Bunya Street Eagle Farm Q 4009
Ph. (07) 3403 1849
Fx. (07) 3403 1898

Brisbane Water
Engineering Services

14 NOVEMBER 1996

OPERATING MANUAL FOR:

OXLEY CREEK SCREENS BUILDING

CATHODIC PROTECTION SYSTEM

CLIENT:

BRISBANE WATER
WASTE WATER TREATMENT PLANT OXLEY

MANUAL CONTENTS

DRAWINGS

486/5/5-R3E302P	Fine Screenings Complex Outlet Pipework Plan
486/5/5-R3E301P	Fine Screenings Complex Inlet Pipework Plan
486/5/5-R3E303P	
486/6/25-AA1C0021E	Standard Rectifier Wiring Diagram
(No Number)	Monthly Maintenance Program

(1.0) INTRODUCTION

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

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

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

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

(2.0) CORROSION AND CATHODIC PROTECTION

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

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

In applying cathodic protection and 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) PIPE DETAILS

Size:	New Dia. 1060 mild steel cement lined,between Screens Building and Pump Stn .Dia 910 mm for Proposed South WWTP and Dia.1050 Outlet
pipes,	and existing pipes cement lined.
Coating:	Medium Density Fusion Bonded Polyethylene
Length:	Appox 91meters (New 1060 Dia–6 meters)
Location:	OXLEY CREEK WASTE WATER TREATMENT PLANT Donaldson Rd. Oxley

Construction Drawings:

486/5/5–R3E301P	Oxley Creek Wastewater Treatment Plant Upgrade Phase 1
to	
486/5/5–R3E301P	

(4.0) CATHODIC PROTECTION DETAILS

(4.1) Type of Cathodic Protection: Impressed Current.

(4.2) Rectifier: Special 25 Volt, 25 amp direct current output enclosed in a stainless steel switchboard. Rectifier has a 240V supply from within the main switchboard located inside the pump station on ground floor level.

(4.3) Cathode: The cathode points are located on the various mains, adjacent to but external to the screen building. The cathode point is where the cabling from the rectifier is attached to the structure under cathodic protection.

(4.4) Anodes: one 1500 x 75mm silicone iron anode was installed approximately 30 metres from the screen building in a vertical bed. The anode was firstly packaged with cokebreeze thereby improving anode – ground resistance. The anode is identified by a label on the pit lid directly above the single anode.

(4.5) Test Points: Test points are installed on cathodically protected structures to enable testing to ensure full protection of the mains. On these mains six test points have been installed on the new pipes,one each at the cathode points ,and one at each end of the outlet pipes before the connection to the existing pipework for the primary tanks. In total, the system has 6 test points which can be identified from the layout drawing.

(4.6) Associated Drawings:

Cathodic Protection Details	– 2/14.213
Cathodic Protection Test Point Details	– 2/14.199
Standard Rectifier Wiring Diagram	– 486/6/25–AA1C0021E
Standard Vertical Groundbed Details	– 486/6/25–AA1C0024E

(4.7) Associated Standards:

AS 3000 1986 Australia Wiring Rules

AS 2832.1 1985 Pipes, Cables, Ducts, Guide to Cathodic Protection, Part One.

(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.

(6.0) CONCLUSION

Full Cathodic protection has been achieved on this section of trunk mains. The cathodic protection system is 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.

12th October 1996
Electrical Engineering Unit
Cathodic Protection

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.

12th October 1996
Electrical Engineering Unit
Cathodic Protection

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.

12th October 1996
Electrical Engineering Unit
Cathodic Protection

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.

Brisbane Water Engineering Services

Electrical Engineering Unit

Ph. 34031838 Fx. 34031839
5 Bunya Street
Eagle Farm Q 4009

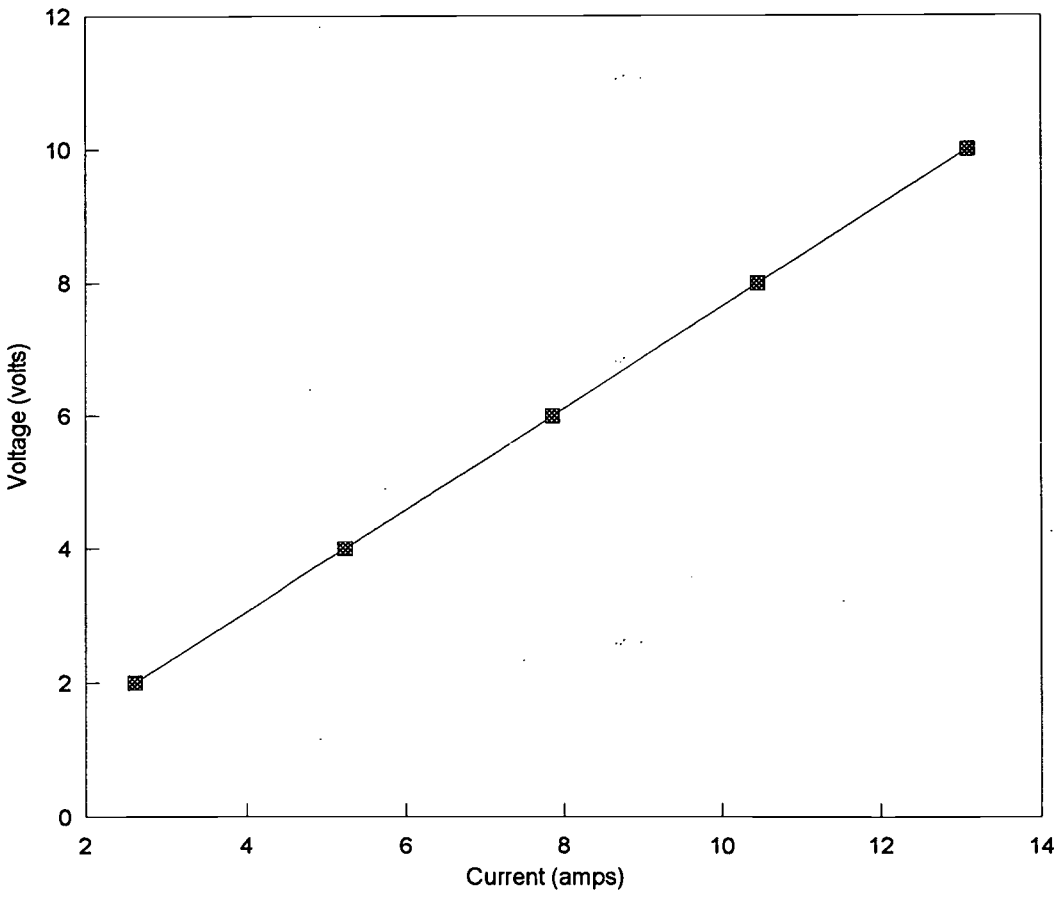
Cathodic Protection System Loop Resistance

Date: 22 nd October 1996
Cathodic Protection System: Oxley Screens Building
System Operating Volts: 8.1 System Operating amps 10.6

Test Voltage: (volts)	Test Current: (amps)
2	2.61
4	5.23
6	7.85
8	10.46
10	13.08

Loop Resistance (ohms)
0.764818

Graph of System voltage vs current.



11/19/96 LOPOXSCR.WK4

WACOL TO OXLEY SCREENS BUILDING

Date 16/10/96 — SYSTEM= 12 VOLTS 15 AMPS

NATURAL — NONPOLARISED

TEST POINT	CUS04/PIPE	CUS04/ZN	ZN/PIPE	CUS04/PIPE ON	CUS04/PIPE OFF
1	-150	-890	700	-160	-10
2	-78	-175	550	-440	-362
3	-286	-790	449	-450	-164
4	-285	-1049	700	-460	-175
5	-290	-1100	770	-410	-120
6	-298	-1110	780	-405	-116

Date 17/10/96 — SYSTEM= 11.5 VOLTS 14.1 AMPS

POLARISED — ON/OFF TESTING — RESULTS

TEST POINT	CUS04/PIPE	CUS04/PIPE ON	CUS04/PIPE OFF	SWING ON/OFF	SWING ON/NAT
1	-266	-266	-237	-29	-116
2	-659	-652	-465	-197	-571
3	-573	-574	-505	-69	-287
4	-591	-591	-535	-56	-306
5	-531	-530	-506	-24	-241
6	-531	-529	-505	-24	-242

Date 22/10/96 — SYSTEM=8.1 VOLTS 10.6 AMPS

POLARISED — ON/OFF TESTING — RESULTS

TEST POINT	CUS04/PIPE	CUS04/PIPE ON	CUS04/PIPE OFF	SWING ON/OFF	CONTINUITY
1	-260	-262	-240	-22	
2	-634	-636	-494	-142	
3	-561	-560	-531	-29	2.7
4	-575	-574	-512	-62	1
5	-528	-527	-509	-18	0.2
6	-529	-526	-509	-17	0.1

tested by J TAYLOR

WACOL TO OXLEY SCREENS BUILDING

Date 16/10/96 SYSTEM= 12 VOLTS 15 AMPS

NATURAL NONPOLARISED

TEST POINT	CUS04/PIPE	CUS04/ZN	ZN/PIPE	CUS04/PIPE ON	CUS04/PIPE OFF
1	-150	-890	700	-160	-10
2	-78	-175	550	-440	-362
3	-286	-790	449	-450	-164
4	-285	-1049	700	-460	-175
5	-290	-1100	770	-410	-120
6	-298	-1110	780	-405	-116

Date 17/10/96 SYSTEM= 11.5 VOLTS 14.1 AMPS

POLARISED ON/OFF TESTING RESULTS

TEST POINT	CUS04/PIPE	CUS04/PIPE ON	CUS04/PIPE OFF	SWING ON/OFF	SWING ON/NAT
1	-266	-266	-237	-29	-116
2	-659	-652	-465	-197	-571
3	-573	-574	-505	-69	-287
4	-591	-591	-535	-56	-306
5	-531	-530	-506	-24	-241
6	-531	-529	-505	-24	-242

tested by J Taylor

BRISBANE CITY COUNCIL

MEMORANDUM

To	File No.
From	Date 28/9/95

Subject OXLEY CREEK SCREENS BUILDING. ON/OFF POTENTIALS & INTERFERENCE TESTS.

ON/OFF POTENTIALS

	TEST POINT 1		TEST POINT 2	
	ON	OFF	ON	OFF
CUSO4 TO PIPE	-440MV	-364MV	-712MV	-450MV
CUSO4 TO ZINC	-958MV	-957MV	-1000MV	-1005MV
ZINC TO PIPE	520MV	596MV	285MV	485MV

(TEST POINTS 3 & 4 HAVE CATHODE BONDS BETWEEN THEM.)

	TEST POINT 3		TEST POINT 4	
	ON	OFF	ON	OFF
CUSO4 TO PIPE	-522MV	-468MV	-634MV	-421MV
CUSO4 TO ZINC	-919MV	-917MV	-1072MV	-1053MV
ZINC TO PIPE	384MV	447MV	553MV	632MV

TEST POINTS 5 & 6 ARE NOT SURROUNDED IN ELECTROLYTE (DIRT).

INTERFERENCE TESTS. TO CUSO4 HALF CELL.

STRUCTURE	ON	OFF
VALVE STEM IN NEW SCREEN	-540MV	-480MV
SUBMERGED STEEL IN NEW SCREEN	-546MV	-484MV
STAINLESS PIPEWORK NEW SCREEN	-539MV	-482MV
LIGHT POST (P8)	-475MV	-480MV
NEW SCREEN R-BAR IN SLAB	-720MV	-533MV
PENSTOCK WELL LADDER	-704MV	-510MV
STEEL IN EXISTING TANKS.	-925MV	-740MV
DELIVERY PIPES UNDER P/STN.	-683MV	-490MV
CABLE TRAY UNDER P/STN	-682MV	-490MV
PUMP IMPELLA SHAFT	-678MV	-487MV
OTHER PIPEWORK	-663MV	-470MV
HANDRAIL UNDER P/STN	-696MV	-480MV
BLOWER & MOTOR IN P/STN	-680MV	-490MV

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Oxley Screens bld. **Unit Reading** 12 Volts 15 Amps **Date** 17-10-96

	Reading	Test Point I. D.	Location	Swing
On	-235	Green Pipe	EFLUENT PIPE @ T.P. 1.	00
Off	-235			
On	-242	Street Light	Street Light @ TP 1.	-8
Off	-234			
On	-175	Rotork	Rotork @ TP1	-00
Off	-175			
On	-467	Reo	Reinforsing New work opp end to screens.	-1
Off	-466			
On	-359	meter Pannel	Seq eb. Meter Pannel @ TP 1.	-14
Off	-345			
On	-774	Alum Stairs	South Side of Screens Bld.	-20
Off	-754			
On	-510	Ladder Rack	Bolted to South side of Screens Bld	-42
Off	-468			
On	-242	Ladder Rack	North side Screens Bld.	-22
Off	-220			
On	-455	Gate Valve	Scour for Screens Bld.	-14
Off	-441			
On	-339	STAIRS Allum	North Side Screens Bld.	00
Off	-339			
On	-299	Duct Allum	North & West Sides screens Bld.	-7
Off	-292			
On	-315	EFFLUENT PIPE	Under Stairs Nth Side Screens Bld.	-9.
Off	-306			
On	-252	Pipe 750	Feed Pipe to Station Middle Pump Set	00
Off	-252			
On	-252	Pipe 750	Feed Pipe to Station South Pump Set	00
Off	-252			
On	-257	Pipe 600	Feed Pipe to Station Nth End.	-4
Off	-253			

TESTED BY J.S.

Revision 09/28/95

Brisbane Water Engineering Services

CP Form No. 27

Electrical Engineering Unit

Cathodic Protection Interference Survey Results Form

Project Oxley Screens Bld. **Unit Reading** 12 Volts 15 Amp **Date** 17-10-96

	Reading	Test Point I. D.	Location	Swing
On	-563	Street Light	@ TP-2 Nth of Screens Bld.	-85
Off	-478			
On	-259	Ladder	To Roof of Amenities Bld.	-13
Off	-246			
On	-259	Water Tap	Supply to Amenities Bld.	-00
Off	-259			
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				
On				
Off				

TESTED BY JS.

Revision 09/28/95

Brisbane City Council
DEPARTMENT OF WATER SUPPLY AND SEWERAGE

MECHANICAL AND ELECTRICAL SERVICES BRANCH

JS:

TO: MIKE JUKES

FROM: JIM STEELE

SUBJECT: OXLEY CREEK - WASTE WATER TREATMENT PLANT
FINE SCREENINGS COMPLEX

DATE: 30 March 1994

TESTING OF THE ABOVE FACILITY FOR ELECTRICAL CONTACT BETWEEN THE BUILDING'S CONCRETE STEEL REINFORCEMENT AND THE PIPING, AS INDICATED ON THE DRAWING WAS CONDUCTED ON 28/3/94.

THE TESTING WAS UNDERTAKEN BY INSTALLING A TEMPORARY CATHODIC PROTECTION SYSTEM SUCH THAT DC CURRENT COULD BE SWITCHED BY CYCLING 20 SECONDS ON, 5 SECONDS OFF.

THE SWITCHING OF THE TEMPORARY DC CURRENT SOURCE PROVIDES DETAILS OF;

a) WHICH STRUCTURES ARE AFFECTED BY THE CURRENT FLOW
b) THE MAGNITUDE AND DIRECTION OF THE VOLTAGE SHIFT ON THE STRUCTURES

IT SHOULD BE NOTED THAT AS THIS WAS ONLY A TEMPORARY INSTALLATION THE CURRENT OUTPUT IS LIMITED, HENCE CATHODIC PROTECTION PROTECTED POTENTIAL VOLTAGES WERE NOT ACHIEVED, BUT IS NOT NECESSARILY RELEVANT TO THE TESTING FOR CONTINUITY/ ELECTRICAL CONTACT.

THE NATURAL (AS FOUND) POTENTIALS ARE CONSIDERED LOW AND AS NO INSULATING FLANGES ARE INSTALLED COULD BE DUE TO EITHER;

a) CONTACT TO REINFORCING STEEL
b) CONNECTION TO ELECTRICAL EARTHING SYSTEMS ie ELECTRIC VALVES etc
c) COATED PIPEWORK IS CONCRETE ENCASED

THE RESULTS OF THE TESTING CONFIRMED THAT THE PIPEWORK POTENTIALS COULD BE SHIFTED APPROXIMATELY 100-150 mV.

THEREFORE WE BELIEVE THAT NO DIRECT CONNECTION TO REINFORCING STEEL EXISTS HENCE IF INSULATING FLANGES WERE INSTALLED IN THE CORRECT POSITIONS THEN A SATIFACTORY CATHODIC PROTECTION SYSTEM COULD BE INSTALLED.

MEMORANDUM

To

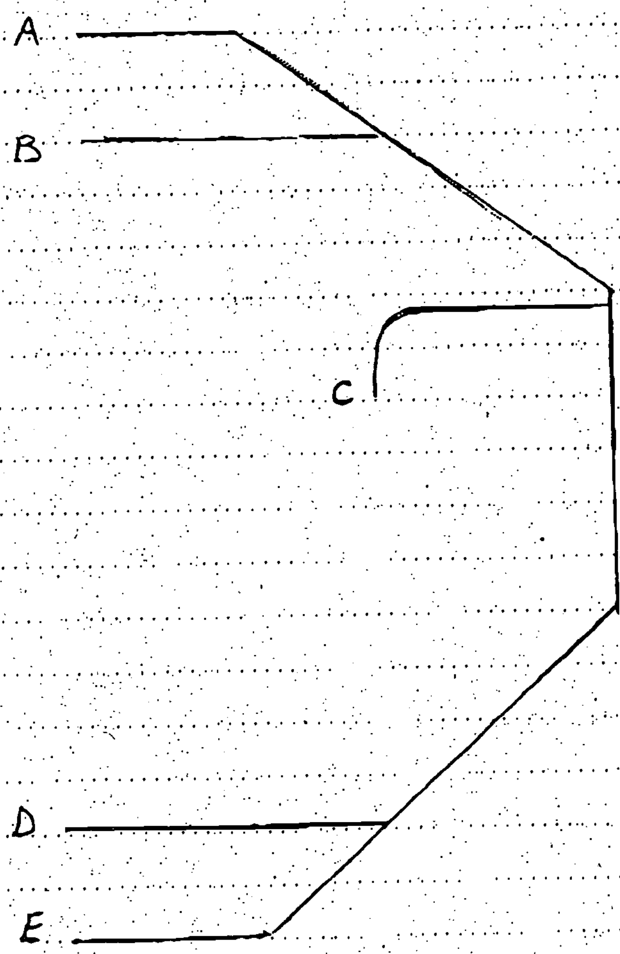
File No.

From

Date 28/3/94

Subject OXLEY CREEK WWTP
FINE SCREENINGS COMPLEX

Unit Reading 18.8 Volt at 1.85 Amps
$CuSO_4$ Ref



Railing near D
on - 569 mV
off - 634 mV

Cable Tray near B
14Ω Res to pipe to cable tray

Pipe near A.
Pipe to 6" Pipe
2Ω Res.

(D) on - 244 mV
off - 136 mV

(E) on - 174 mV
off - 124 mV

(A) on - 276 mV
off - 135 mV

(B) on - 276 mV
off - 135 mV

(C) on - 283 mV
off - 137 mV

Cable Tray near B
on - 268 mV
off - 143 mV

Grit & Raw Sludge SwitchBoard near D
on - 142 mV
off - 80 mV

TEST POINT 1.

BRISBANE CITY COUNCIL
EAGLE FARM PUMPING STATION
CORROSION SECTION

STANDARD CATHODIC PROTECTION TEST POINT DATA GATHERING

DATE: 4-5-95
TEST POINT TYPE: B
LOCATION: OXLEY CREEK SCREEN
MAINS SIZE: IN PIT OFFICE SIDE.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE): <2Ω
ZINC REFERENCE TO PIPE: + 658MV
$CuSO_4$ REFERENCE TO PIPE: - 110 MV
ZINC TO $CuSO_4$: -768MV

EARTH TESTING

PIN SPACING: MEGGER READING: RESISTIVITY:

PIN SPACING: MEGGER READING: RESISTIVITY:

SACRIFICIAL ANODE
(IF INSTALLED)

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

$CUSO_4$ REF TO PIPE:
(ANODE CONNECTED)

SACRIFICIAL ANODE CURRENT:

BLEED RESISTOR SIZE:
(IF INSTALLED)

INSTALLED BY:

COMMENTS:

1 COPY TO FILE
1 COPY TO T.O.

TEST POINT 2.

BRISBANE CITY COUNCIL
EAGLE FARM PUMPING STATION
CORROSION SECTION

STANDARD CATHODIC PROTECTION TEST POINT DATA GATHERING

DATE: 4-5-95
TEST POINT TYPE: B
LOCATION: OXLEY CREEK SCREEN IN PIT DRYING PAN SIDE
MAINS SIZE:

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE): < 2Ω
ZINC REFERENCE TO PIPE: +516MV
$CuSO_4$ REFERENCE TO PIPE: -271 MV
ZINC TO $CuSO_4$: - 787MV

EARTH TESTING

PIN SPACING: MEGGER READING: RESISTIVITY:

PIN SPACING: MEGGER READING: RESISTIVITY:

SACRIFICIAL ANODE
(IF INSTALLED)

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

$CUSO_4$ REF TO PIPE:
(ANODE CONNECTED)

SACRIFICIAL ANODE CURRENT:

BLEED RESISTOR SIZE:
(IF INSTALLED)

INSTALLED BY:

COMMENTS:

1 COPY TO FILE
1 COPY TO T.O.

BRISBANE CITY COUNCIL
EAGLE FARM PUMPING STATION
CORROSION SECTION

TEST POINT 3.

STANDARD CATHODIC PROTECTION TEST POINT DATA GATHERING

DATE: 4-5-95
TEST POINT TYPE: B
LOCATION: OXLEY CREEK SCREEN
MAINS SIZE: IN RECTIFIER FOR PIPE OFFICE SIDE

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE): < 2Ω
ZINC REFERENCE TO PIPE: +634 MV
$CuSO_4$ REFERENCE TO PIPE: -216 MV
ZINC TO $CuSO_4$: - 849 MV

EARTH TESTING

PIN SPACING: MEGGER READING: RESISTIVITY:

PIN SPACING: MEGGER READING: RESISTIVITY:

SACRIFICIAL ANODE
(IF INSTALLED)

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

$CUSO_4$ REF TO PIPE:
(ANODE CONNECTED)

SACRIFICIAL ANODE CURRENT:

BLEED RESISTOR SIZE:
(IF INSTALLED)

INSTALLED BY:

COMMENTS:

1 COPY TO FILE
1 COPY TO T.O.

TEST POINT 4.

BRISBANE CITY COUNCIL
EAGLE FARM PUMPING STATION
CORROSION SECTION

STANDARD CATHODIC PROTECTION TEST POINT DATA GATHERING

DATE: 4-5-95
TEST POINT TYPE: B

LOCATION: OXLEY CREEK SCREEN
MAINS SIZE: IN RECTIFIER FOR PIPE ADJ RECTIFIER.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE): < 2Ω
ZINC REFERENCE TO PIPE: +703MV
$CuSO_4$ REFERENCE TO PIPE: -207MV
ZINC TO $CuSO_4$: -910MV

EARTH TESTING

PIN SPACING: MEGGER READING: RESISTIVITY:

PIN SPACING: MEGGER READING: RESISTIVITY:

SACRIFICIAL ANODE
(IF INSTALLED)

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

$CUSO_4$ REF TO PIPE:
(ANODE CONNECTED)

SACRIFICIAL ANODE CURRENT:

BLEED RESISTOR SIZE:
(IF INSTALLED)

INSTALLED BY:

COMMENTS:

1 COPY TO FILE
1 COPY TO T.O.

TEST POINT 5.

BRISBANE CITY COUNCIL
EAGLE FARM PUMPING STATION
CORROSION SECTION

STANDARD CATHODIC PROTECTION TEST POINT DATA GATHERING

DATE: 4-5-95
TEST POINT TYPE: B
LOCATION: OXLEY CREEK SCREEN
MAINS SIZE: IN RECTIFIER FOR PIPE OFFICE SIDE TO CONTROL ROOM.

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE):
ZINC REFERENCE TO PIPE:
$CuSO_4$ REFERENCE TO PIPE:
ZINC TO $CuSO_4$:

EARTH TESTING

PIN SPACING: MEGGER READING: RESISTIVITY:

PIN SPACING: MEGGER READING: RESISTIVITY:

SACRIFICIAL ANODE
(IF INSTALLED)

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

$CUSO_4$ REF TO PIPE:
(ANODE CONNECTED)

SACRIFICIAL ANODE CURRENT:

BLEED RESISTOR SIZE:
(IF INSTALLED)

INSTALLED BY:

COMMENTS:

1 COPY TO FILE
1 COPY TO T.O.

TEST POINT 6.

BRISBANE CITY COUNCIL
EAGLE FARM PUMPING STATION
CORROSION SECTION

STANDARD CATHODIC PROTECTION TEST POINT DATA GATHERING

DATE: 4-5-95
TEST POINT TYPE: B.
LOCATION: OXLEY CREEK SCREEN
MAINS SIZE: IN RECTIFIER FOR PIPE DRYING PAN SIDE TO CONTROL ROOM

POTENTIAL TESTING

CATHODE TO CATHODE RETURN (RESISTANCE):
ZINC REFERENCE TO PIPE:
$CuSO_4$ REFERENCE TO PIPE:
ZINC TO $CuSO_4$:

EARTH TESTING

PIN SPACING: MEGGER READING: RESISTIVITY:

PIN SPACING: MEGGER READING: RESISTIVITY:

SACRIFICIAL ANODE
(IF INSTALLED)

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

$CUSO_4$ REF TO PIPE:
(ANODE CONNECTED)

SACRIFICIAL ANODE CURRENT:

BLEED RESISTOR SIZE:
(IF INSTALLED)

INSTALLED BY:

COMMENTS:

1 COPY TO FILE
1 COPY TO T.O.

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

Electrical Workshop

Cathodic Protection Anode Bed Testing

Date:		Structure:		
Anode material:		Anode size/weight:		
Packaging:		Burial:		
Depth:		Resistivity:		
Test Point type:		Signage:		
Resistance to ground:				
Anode 1	Anode 2	Anode 3	Anode 4	
Tested by:			Anode 5	
Locality Plan:				

BRISBANE CITY COUNCIL

MEMORANDUM

To	File No.
From	Date 4/11/94
Subject OXLEY CREEK SOIL RESTISTIVITY	

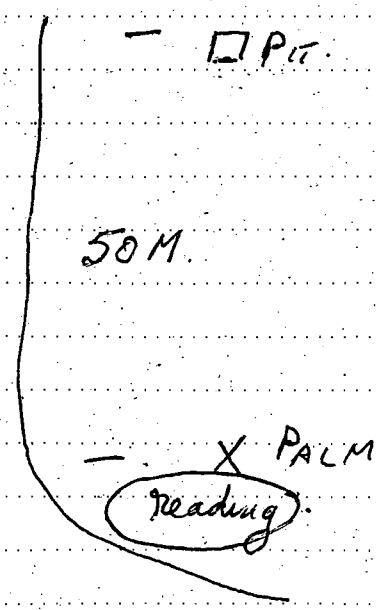
At 2.0M reading 2.16.

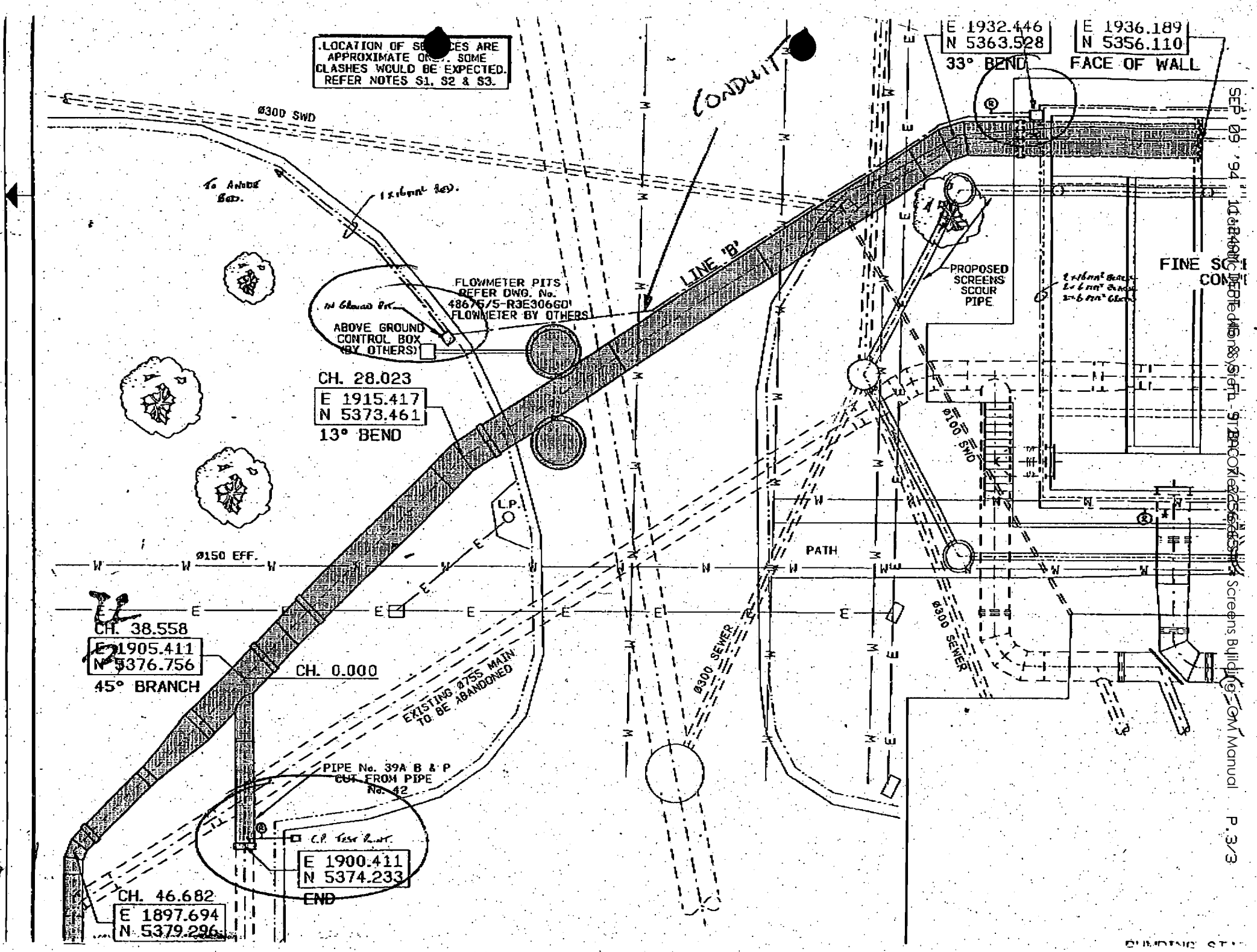
$2\pi \times D \times 2.16 = 27.13\,\Omega$ metres

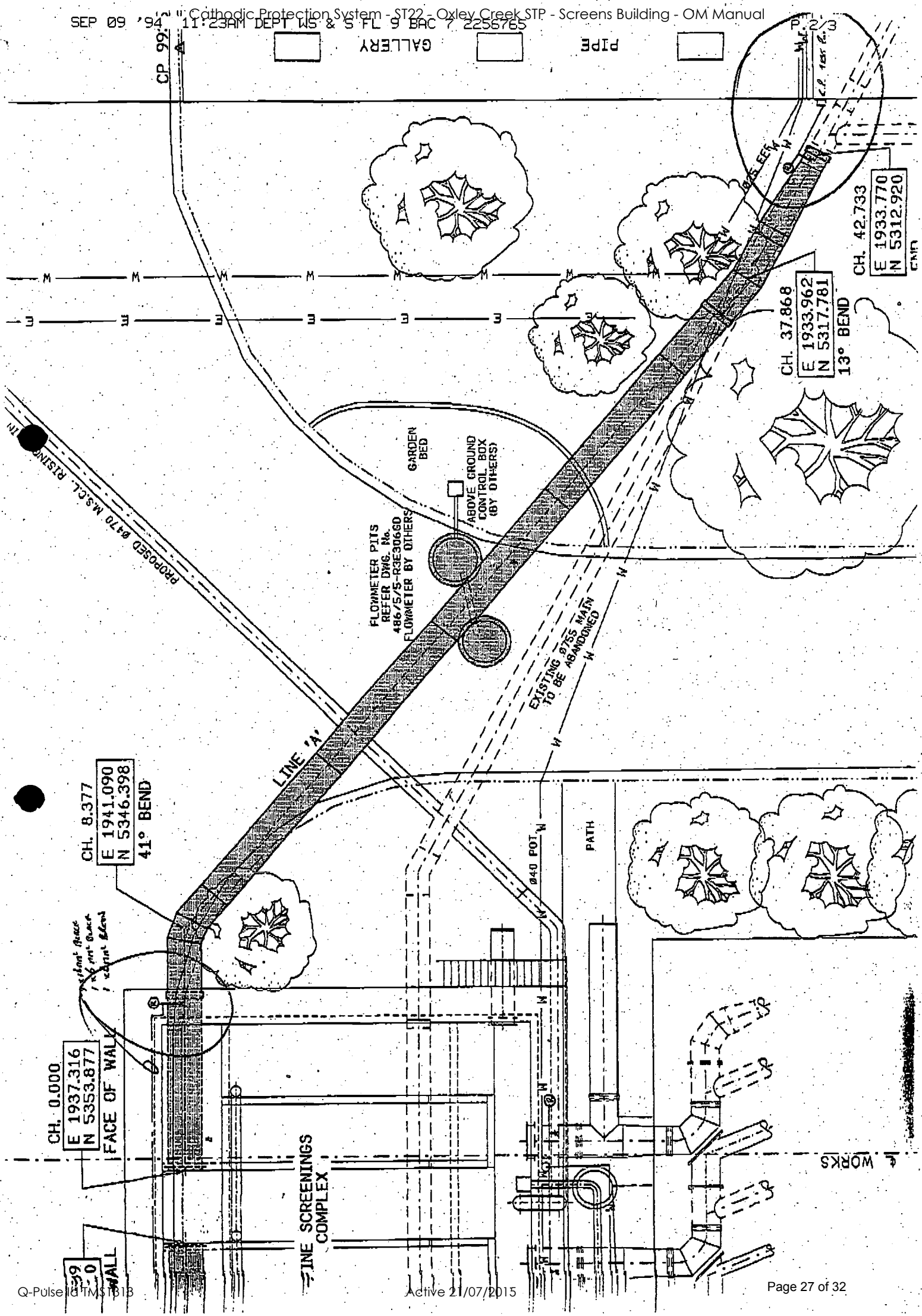
At 5.0M reading 0.18

$2\pi \times D \times 0.18 = 5.65\,\Omega$ metres

Distance from pit to palm = 50M.





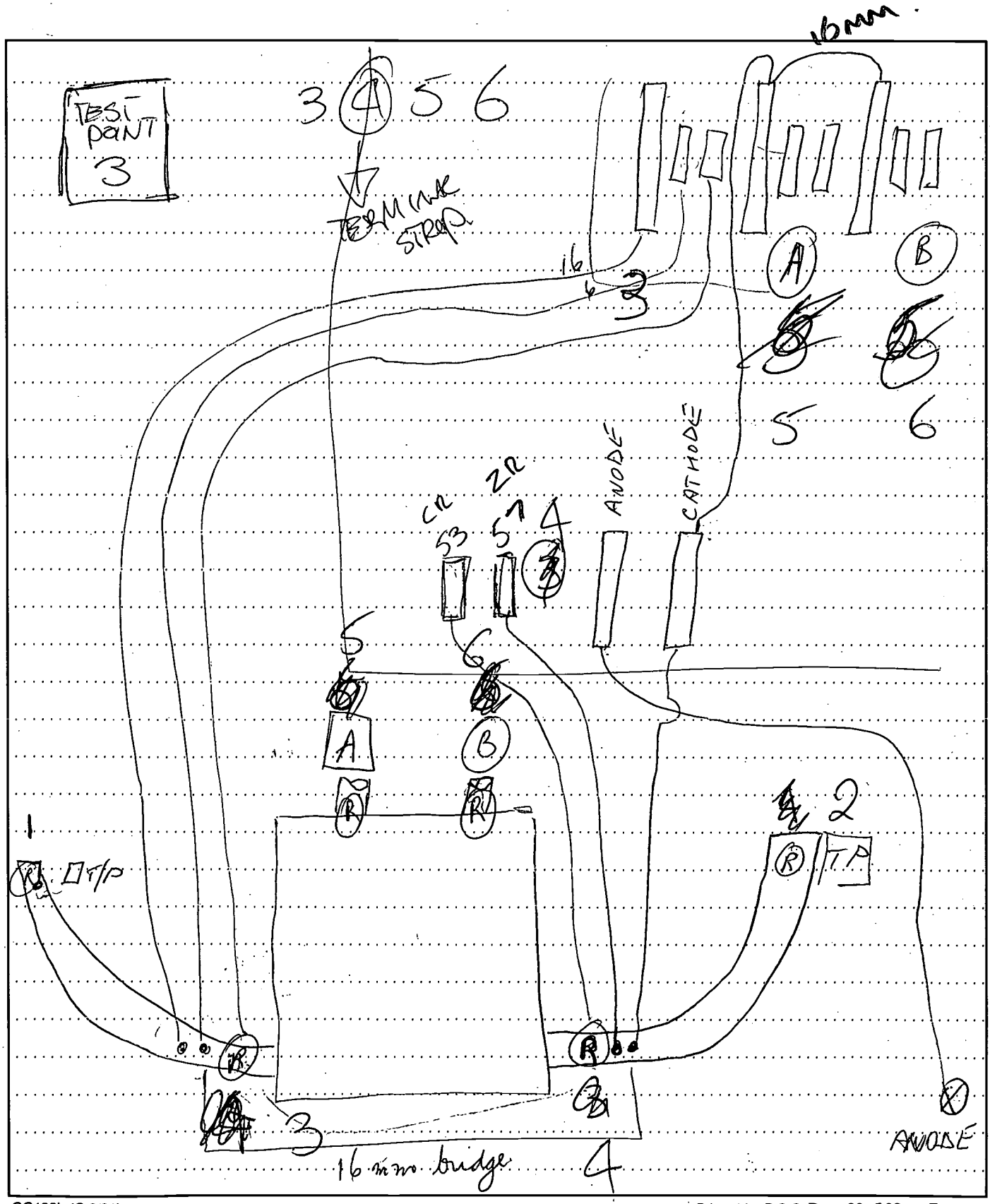

SEP 09 '94 11:23AM DEPT WS & S FL 9 BAC 7 2256765 P.2/3
GALLERY
PIPE
CP 99
CH. 42.733
E 1933.770
N 5312.920
CH. 37.868
E 1933.962
N 5317.781
13° BEND
GARDEN BED
ABOVE GROUND CONTROL BOX (BY OTHERS)
FLOWMETER PITS REFER DWG. No. 486/S/S-R3E3066D FLOWMETER BY OTHERS
EXISTING 675S MAIN TO BE ABANDONED
LINE 'A'
CH. 8.377
E 1941.090
N 5346.398
41° BEND
PATH
CH. 0.000
E 1937.316
N 5353.877
FACE OF WALL
SCREENINGS COMPLEX
WORKS

BRISBANE CITY COUNCIL

MEMORANDUM

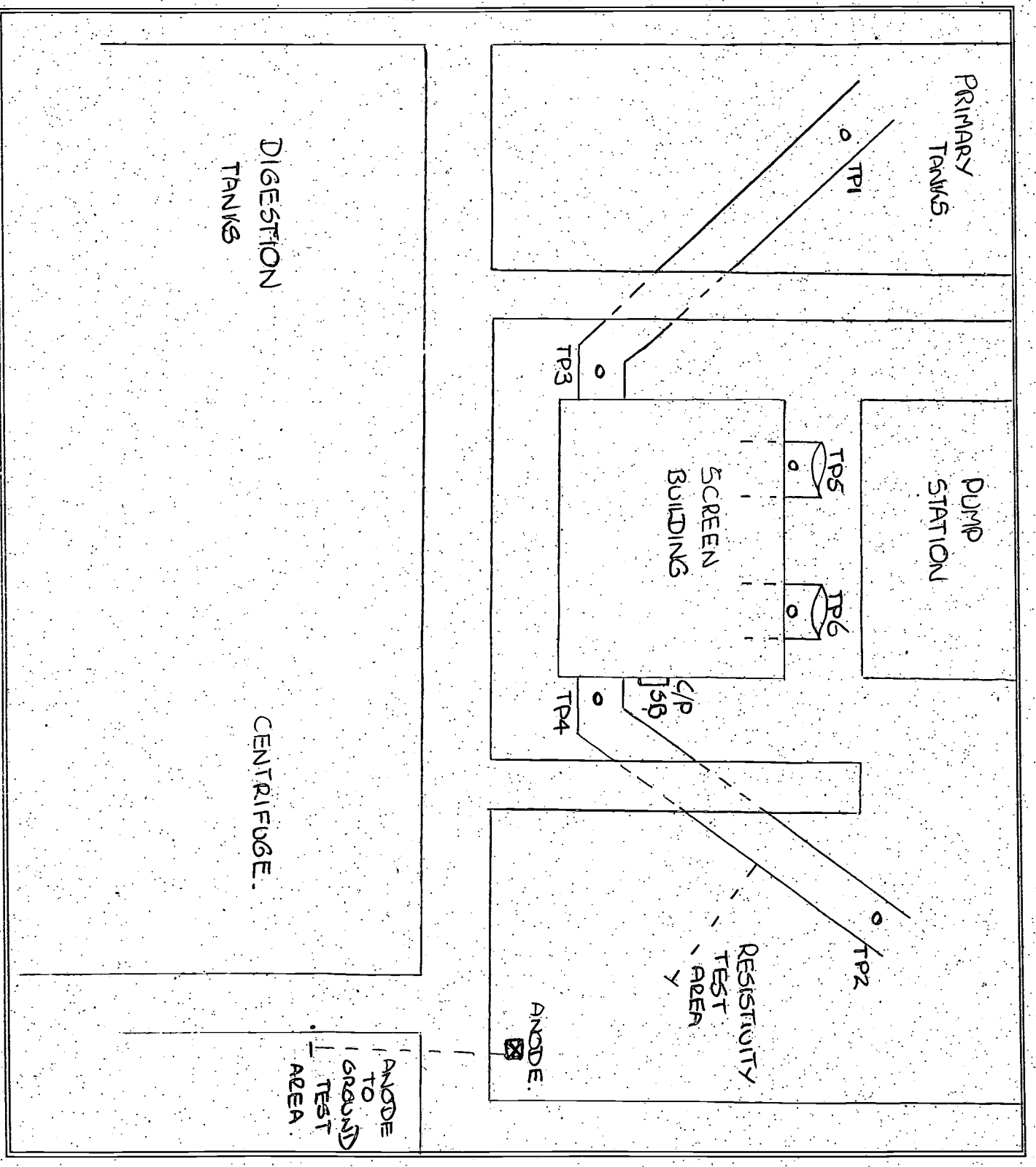
To	File No.
From	Date / /

Subject Oxley Creek Screens Building



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

Date:
Site Plan for: OXLEY CREEK SCREENS
TEST POINT & ANODE LOCATION

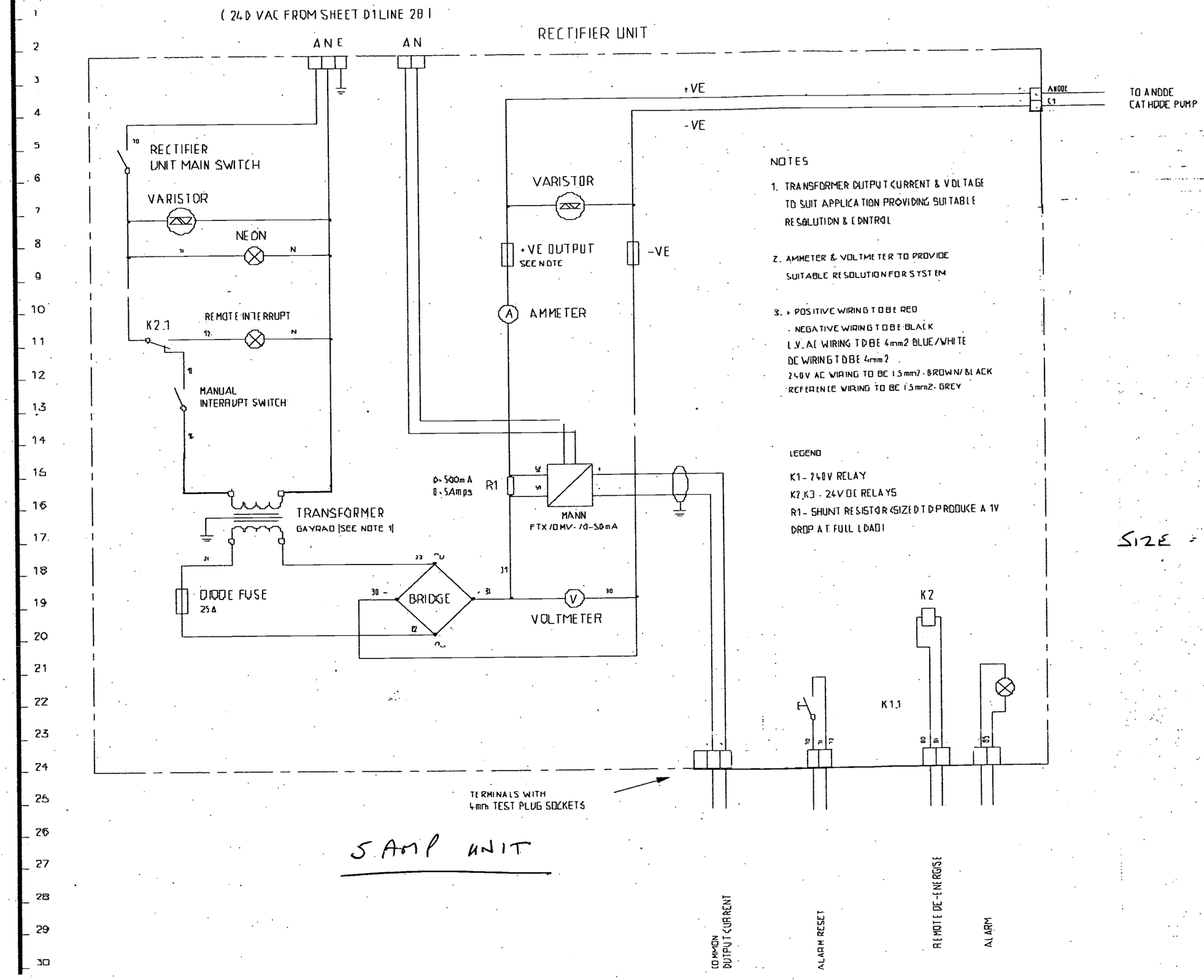


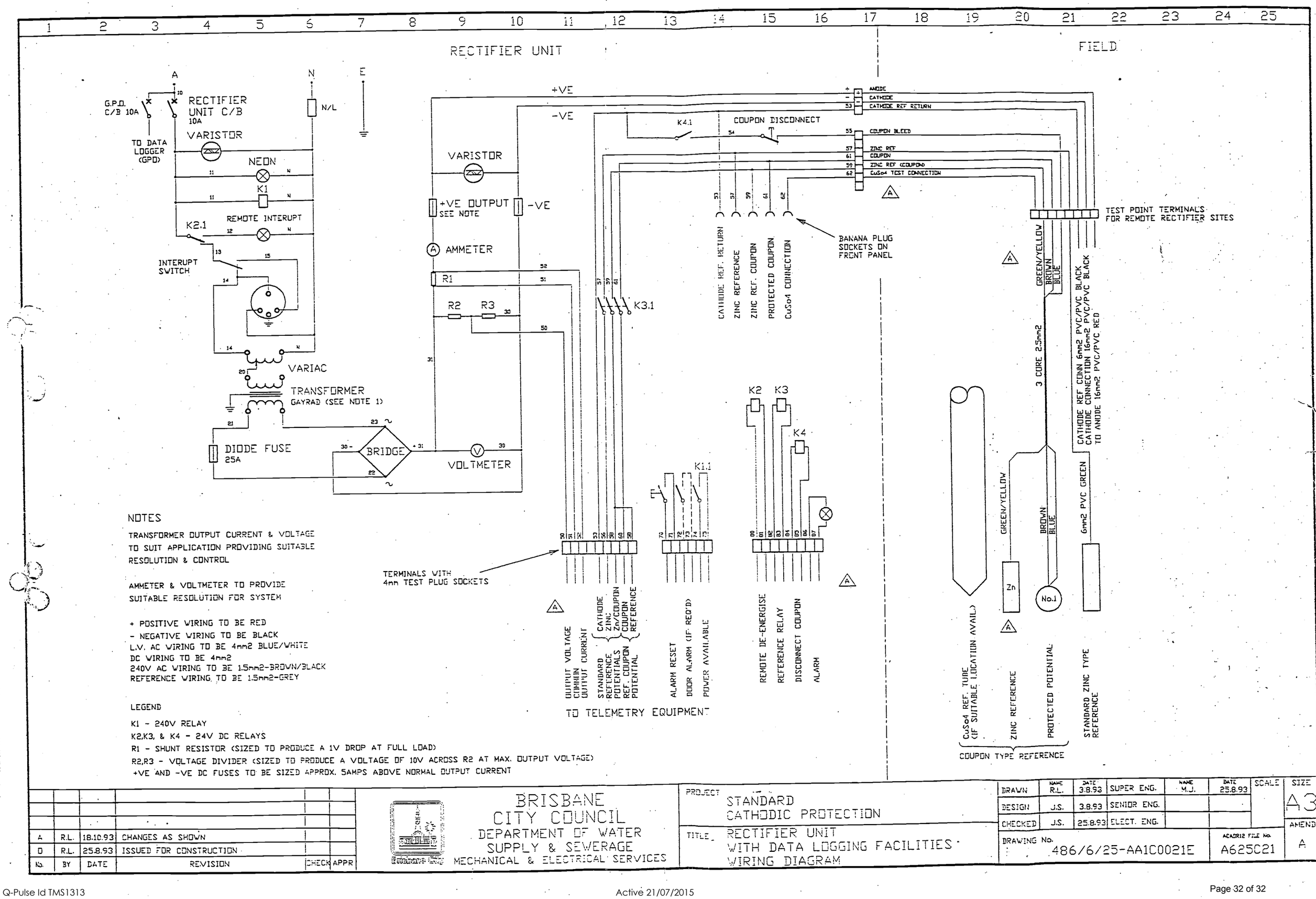
NOTE 8 TEST POINTS, 3,4,5 & 6
TERMINATED IN C/P SWITCHBOARD.
TEST POINTS, 1,2
TERMINATED IN TE

D:\123r3cp\siteplan

Oxley
Screens Bld
8V OA.

Diode Fuse.
Replace with
fuse.
Bridges required.


(240 VAC FROM SHEET 01 LINE 28)
RECTIFIER UNIT
ANE
AN
+VE
-VE
ANODE
C1
TO ANODE
CATHODE PUMP
RECTIFIER
UNIT MAIN SWITCH
VARISTOR
NEON
K2.1
REMOTE INTERRUPT
MANUAL
INTERRUPT SWITCH
TRANSFORMER
GAYRAD (SEE NOTE 1)
DIODE FUSE
25A
BRIDGE
0-500mA
0.5Amps
R1
MANN
FTX 10MV- 10-50mA
VOLTMETER
+VE OUTPUT
SEE NOTE
-VE
AMMETER
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
LV 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
LEGEND
K1 - 240V RELAY
K2,K3 - 24V DC RELAYS
R1 - SHUNT RESISTOR SIZED TO PRODUCE A 1V DROP AT FULL LOAD
K2
K1.1
TERMINALS WITH
4mm TEST PLUG SOCKETS
COMMON
OUTPUT CURRENT
ALARM RESET
REMOTE DE-ENERGISE
ALARM
5 AMP UNIT
SIZE -



NOTES

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

AMMETER & VOLTMETER TO PROVIDE SUITABLE RESOLUTION FOR SYSTEM

\+ 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

LEGEND

K1 - 240V RELAY
K2,K3, & K4 - 24V DC RELAYS
R1 - SHUNT RESISTOR (SIZED TO PRODUCE A 1V DROP AT FULL LOAD)
R2,R3 - VOLTAGE DIVIDER (SIZED TO PRODUCE A VOLTAGE OF 10V ACROSS R2 AT MAX. OUTPUT VOLTAGE)
+VE AND -VE DC FUSES TO BE SIZED APPROX. 5AMPS ABOVE NORMAL OUTPUT CURRENT

No.	BY	DATE	REVISION	CHECK	APPR
A	R.L.	18.10.93	CHANGES AS SHOWN		
0	R.L.	25.8.93	ISSUED FOR CONSTRUCTION		

BRISBANE CITY COUNCIL
DEPARTMENT OF WATER SUPPLY & SEWERAGE
MECHANICAL & ELECTRICAL SERVICES

PROJECT: STANDARD CATHODIC PROTECTION

TITLE: RECTIFIER UNIT WITH DATA LOGGING FACILITIES WIRING DIAGRAM

	NAME	DATE		NAME	DATE	SCALE	SIZE
DRAWN	R.L.	3.8.93	SUPER ENG.	M.J.	25.8.93		A3
DESIGN	J.S.	3.8.93	SENIOR ENG.				
CHECKED	J.S.	25.8.93	ELECT. ENG.				AMEND A

DRAWING No. 486/6/25-AA1C0021E
ACADR12 FILE No. A625C21