

P & I Design Ltd

Process Instrumentation Consultancy & Design

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IMMINGHAM STORAGE CO LTD
WEST TERMINAL
BUND G – GAS DETECTION SYSTEM
DOCUMENTATION MANUAL

Rev	Date	By	Checked	Approved	Description	Client Ref.
A	01.12.11	D. Smith	MM	MM	Original Issue	
						Document No. SI051001_MNL
						Page 1 of 4

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Contents

1. Register Control System
2. Basis of Design
3. Drawings & Schedules
4. Specifications
5. Installation Scope of Work
6. ATEX Certificates
7. Testing & Handover
8. Manufacturers' Documentation



Section 1
Register Control System



Register Control System

<u>Register No</u>	<u>Description</u>	<u>Issue</u>
SI051001_REG	Drawing Register	A
SI051002_REG	Report Register	A
SI051003_REG	Specification Register	A



CLIENT:
Immingham Storage co Ltd

REV	DATE	BY	CHKD	APPD
A	01.12.11	DS	MM	MM

CLIENT REF.
Bund G Gas Detection
P & I REF.
SI051001_REG
SHT 1 OF 1

DRAWING NO	REVISION						DESCRIPTION
	ISSUE	0	A	B	C	D	
SI051001_DWG						D	Equipment Layout
SI051002_DWG						C	Cable Overview
SI051005_DWG						B	Gas Sensors Loop Sheet
SI051001_SCH						B	Cable Schedule

CLIENT:
Immingham Storage co Ltd

REV	DATE	BY	CHKD	APPD
A	01.12.11	DS	MM	MM

CLIENT REF.
Bund G Gas Detection
P & I REF.
SI051001_REG
SHT 1 OF 1

DRAWING NO	REVISION	DESCRIPTION
	ISSUE 0 A B C D E	

Note: A3 drawings are produced to A4, A1 drawings may be produced to A1 or A3

CLIENT:
Immingham Storage co Ltd

ISSUE	DATE	BY	CHKD	APPD
A	01.12.11	DS	MM	MM

CLIENT REF.
Bund G Gas Detection
P & I REF.
SI051002_REG
SHT 1 OF 1

REPORT NO	REVISION					DATE	DESCRIPTION
	ISSUE	0	A	B	C		
SI051001_RPT			B			29.03.11	Basis of Design
SI051001_INS			A			08.04.11	Installation Scope of Work

P & I Design Ltd

CLIENT:
Immingham Storage Co Ltd

Specification Register

ISSUE **DATE** **BY** **CHKD** **APPD**
A 01.12.11 DS MM MM

CLIENT REF
Bund G Gas Detection
P & I REF.
SI051003_REG
SHT 1 OF 1

P&I REF.	ISSUE	REVISION					SUPPLIER	TAG No.	ITEM
		0	A	B	C	D			
SI051001_SPC			A				MSA	AE-G1	Gas Detector
SI051001_SPC			A				MSA	AE-G2	Gas Detector
SI051001_SPC			A				MSA	AE-G3	Gas Detector
SI051001_SPC			A				MSA	AE-G4	Gas Detector
SI051003_SPC				B			E2S	TBA	Operations Office Beacon
SI051003_SPC				B			E2S	TBA	No.2 Switchroom Beacon
SI051004_SPC					B		E2S	N/A	Operations Office Sounder
SI051004_SPC					B		E2S	N/A	No.2 Switchroom Sounder

Section 2
Basis of Design



P & I Design Ltd

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IMMINGHAM STORAGE CO LTD

WEST TERMINAL

BUND G - GAS DETECTION SYSTEM

BASIS OF DESIGN

Rev	Date	By	Checked	Approved	Description	Client Ref.
A	01.03.11	M. Morgan	D.R. Ransome	M. Morgan	Original Issue	
B	29.03.11	M. Morgan	D.R. Ransome	M. Morgan	Clients Comments Incorporated	Document No. SI051001_RPT
						Page 1 of 5

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1 INTRODUCTION

This document details the basis of design for a gasoline flammable gas detection system for Bund G Tanks T95, T96, T103 & T105. The system is required as a result of Layer of Protection Analysis (LOPA) on the facility, the full LOPA can be found in documents SI206001_RPT.

2 BACKGROUND

The LOPA specifies the installation of gas detection as a mitigation layer in order to achieve the desired risk reduction. This recognises that a release is taking place due to the failure of other layers of protection, however the early detection of a vapour cloud forming permits the operators to take action to avoid ignition and/or eliminate the presence of people in the vicinity. The system has a specific requirement for detection of a large vapour cloud as was formed in the events leading up to the Buncefield incident in 2005.

3 GAS DETECTOR PRINCIPLE

There are two types of gas detector

1. Point detectors measure flammable atmospheres at a specific location
2. The open path method uses either a transmitter and receiver in line of sight or in the case of a double pass system a combined transmitter/receiver in one location with a reflector at the extremity of the area to be monitored, again within line of sight.

The point detector principle has been selected for this application based on the following.

- Open path detectors require uninterrupted line of sight. The facility is a multi-purpose storage terminal and therefore subject to continuous change to accommodate contractual obligations. A concern is the unintentional interruption of the line of sight at the bund wall perimeter.
- Open path detectors use the principle of operation that infra-red radiation is attenuated by the presence of a gas cloud and are known to be susceptible to interference by steam. The terminal uses steam extensively.
- Open path detectors whilst useful for tracking the movement of a gas cloud are usually supplemented by point detection systems to identify the actual source of release.
- The particular scenario for which this system is installed requires very still atmospheric conditions. This will therefore eliminate one concern with the point detection method which is wind dispersing the gas in another direction and thus missing the point detector. It is also observed that this problem is most likely to occur with a narrow plume of gas and this is not the case in this scenario.



4 LOCATION

Refer to gas detector location plan drawing SI051001_DWG in the appendices.

There are four tanks within Bund G capable of storing gasoline, Tank 95, Tank 96, Tank 103 & Tank 105.

Tank 95 : Fixed cone roof tank with pressure and vacuum relief valves (no VRU connection)

Tank 96 : Fixed cone roof tank with internal floating deck, atmospheric vents (no VRU connection)

Tanks 103 & 105 : Fixed cone roof tanks with pressure and vacuum relief valves and a connection to the site VRU

It is difficult to predict precisely where the vapour cloud may start to form on the overflow of any tank, but on the basis that this system is designed to detect the formation of a large vapour cloud, the detectors have been positioned at each corner of a notional rectangle surrounding the group of tanks. In selecting the detector locations the following criteria have also been considered.

- Vapour density – gasoline vapour is heavier than air. The detectors are installed at approx. 300mm above ground level
- Due to the ground level and outdoor location selected, manufacturers standard weather protection caps shall be fitted.

The control unit will be located indoors in a safe area, thus enabling interrogation of gas concentrations without approaching the tank bunds.

5 FUNCTIONAL REQUIREMENTS

The system is to raise an alarm to alert operators, this alarm is to be independent of other layers used within the LOPA. The control room at ISCo West terminal is not permanently manned therefore operator alert is proposed in two ways.

- 1) Audible – Two external sounders are proposed with a different tone to existing alarm sounders on the terminal. These will be positioned at Switchroom 2a at the Northern corner of Bund G to provide a warning in the immediate vicinity of the overflow and also at the operations office for alert in the main loading yard.
- 2) Visual – An external blue flashing beacon will be co-located with each of the sounders.

In addition, but for information only, the gas detection system will be integrated into the following.

- 1) A single critical alarm annunciator window will be provided
- 2) An automated radio message will be provided

Failure of either of these two systems to operate will not detract from the ability of this system to raise its alarm.



5.1 Calibration

The gas detectors are for detection of gasoline. They shall be calibrated 0 – 100% LEL for gasoline, with an alarm setpoint at 25% LEL.

5.2 Response Time

The sensors selected have a T_{90} response time of ≤ 30 seconds (i.e. the time to reach 90% of its final value when subjected to a step change in gas concentration). The sensors will therefore raise an alarm to the operator within the time frame necessary to comply with the scenario predicted in the LOPA.

6 MAINTENANCE & CALIBRATION

The system shall be maintained and calibrated in accordance with the manufacturers recommendations. This shall include a full functional test of the entire loop. A work task shall be entered into the site preventative maintenance system to ensure this activity takes place. Records shall be kept to demonstrate system performance.

7 NOMENCLATURE

LEL	Lower Explosive Limit
LOPA	Layer of Protection Analysis
VRU	Vapour Recovery Unit

8 REFERENCES

1. Energy Institute – Model code of safe practice Part 19 2nd edition, Fire precautions at petroleum refineries and bulk storage installations
2. HSE – The selection and use of flammable gas detectors



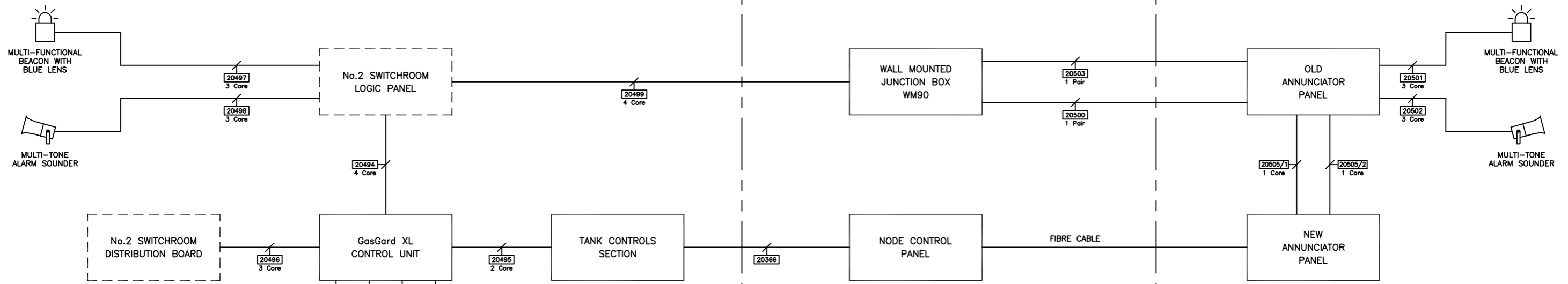
Appendix I

Gas Detector Location Plan SI051001_DWG



Section 3
Drawings & Schedules

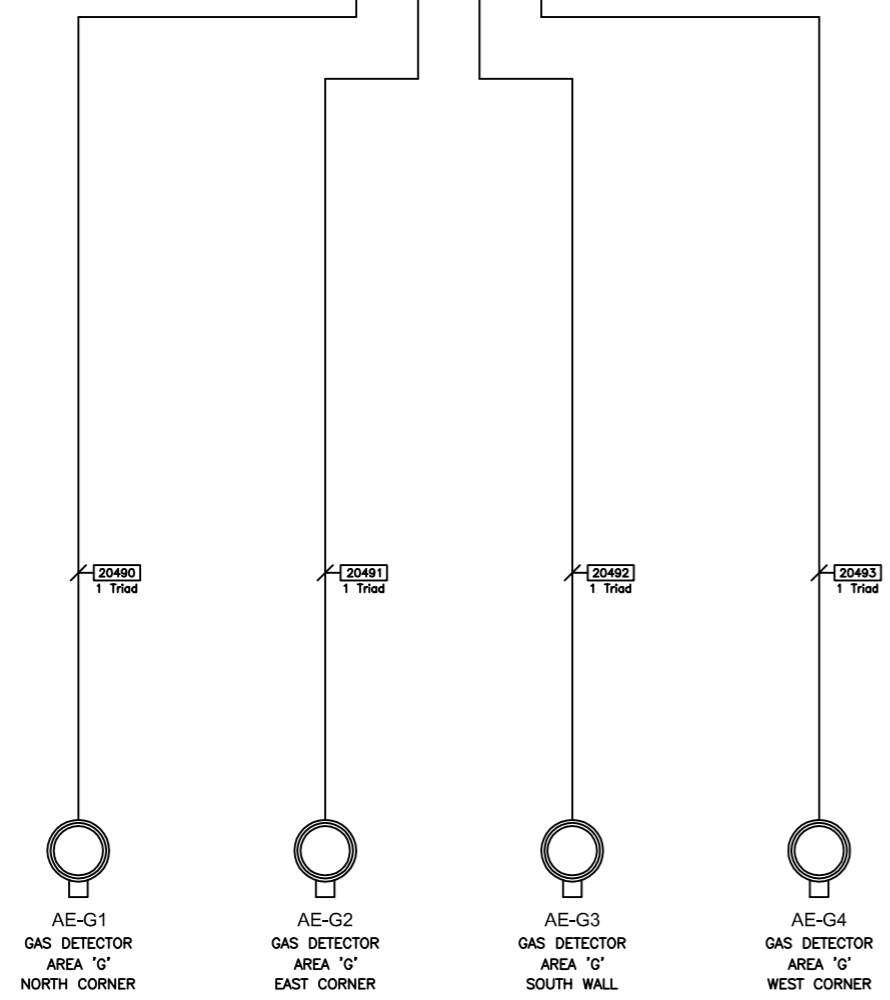




No.2 SWITCHROOM
HAZARDOUS AREA

No.3 SWITCHROOM

OPERATIONS OFFICE



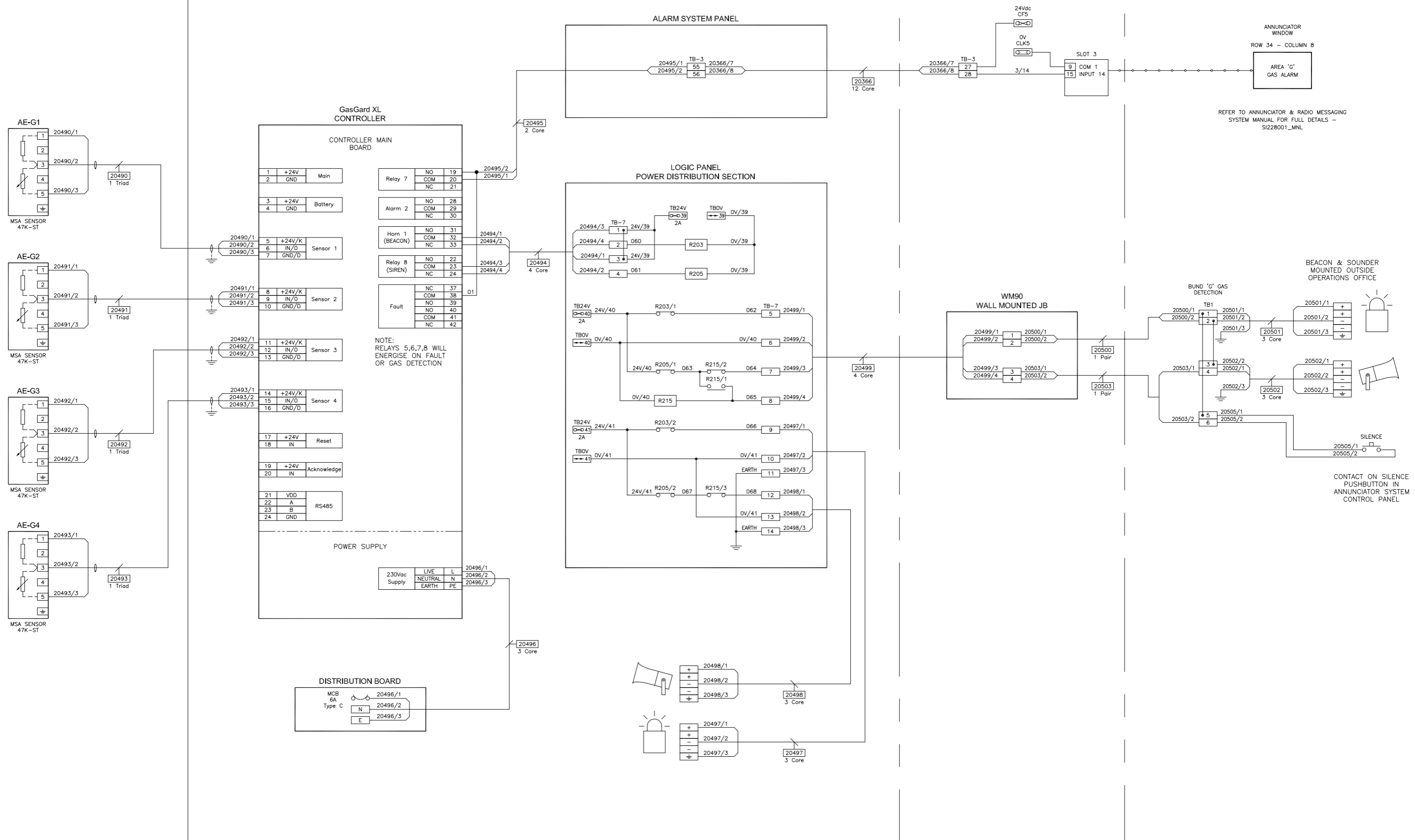
NOTES
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REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	
A	05/05/11	P.P.	P.P.	M.M.	M.M.	M.M.	ISSUED FOR TENDER
B	24/05/11	P.P.	P.P.	M.M.	M.M.	M.M.	ISSUED FOR CONSTRUCTION
C	30/06/11	M.P	D.A.Y	P.P.		M.M.	AS BUILT

PLANT	IMMINGHAM STORAGE Co. - WEST TERMINAL
TITLE	BUND 'G' GAS DETECTION PROJECT CABLE OVERVIEW
CLIENT DRG. No.	P&I DRG No. SI051002_DWG



NOTE: RELAYS 5,6,7,8 WILL ENERGISE ON FAULT OR GAS DETECTION

REFER TO ANNUNCIATOR & RADIO MESSAGING SYSTEM MANUAL FOR FULL DETAILS - SIZ28001_MNL

BEACON & SOUNDER MOUNTED OUTSIDE OPERATIONS OFFICE

CONTACT ON SILENCE PUSHBUTTON IN ANNUNCIATOR SYSTEM CONTROL PANEL

CERTIFIED EQUIPMENT

TAG No.	CERTIFICATE No.	ATEX CERTIFICATION	I.S. CALCULATION
AE-G1	INERIS 03 ATEX 0208	Ex II 2 G EEx d IIC T4/T6	N/A
AE-G2	INERIS 03 ATEX 0208	Ex II 2 G EEx d IIC T4/T6	N/A
AE-G3	INERIS 03 ATEX 0208	Ex II 2 G EEx d IIC T4/T6	N/A
AE-G4	INERIS 03 ATEX 0208	Ex II 2 G EEx d IIC T4/T6	N/A

NOTES

1)

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REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	05/05/11	P.P.	P.P.	M.M.	M.M.	ISSUED FOR CONSTRUCTION
B	30/11/11	M.P.	D.A.Y	P.P.	M.M.	AS BUILT



PLANT: IMMINGHAM STORAGE Co. - WEST TERMINAL
 TITLE: BUND 'G' GAS DETECTION PROJECT GAS SENSORS LOOP SHEET

IMMINGHAM STORAGE CO. LTD.
 IMMINGHAM WEST TERMINAL
 WEST RIVERSIDE,
 IMMINGHAM COCK,
 IMMINGHAM,
 SOUTH HUMBERSIDE
 DN40 2PD

P & I DESIGN Ltd
 Tel. 01642 617444
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SHEET 1 OF 1
 CLIENT DRG. No. P&I DRG No. SI051005_DWG

Section 4
Specifications



P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Immingham West Terminal

REV DATE BY CHKD APPD
A 23.03.11 AMS MM MM

CLIENT REF.
Bund G
P & I REF.
SI051001_SPC
SHT 1 OF 3

ITEM: Gas Detector

GENERAL
Tag Number See Sheet 2
Service See Sheet 2
Area Classification Zone 1 IIB T4

DETECTOR ELEMENT
Type Catalytic
Material: Detector Mfr's std
Sensor Stainless Steel
Temperature Range -25°C to +55°C operating range
Response Time $T_{90} \leq 30$ seconds
Enclosure Class
Electrical Classification Ex II 2G EExd IIC T6
ATEX Certificate INERIS 03ATEX0208
Electrical Connection M25 x 1.5
Power Supply From Gas Gard Control Unit

READ OUT Indication LCD display at GasGard control unit

TRANSMISSION
Type Gas Gard XL Control Unit for 8 sensors
Output 2 off alarm contacts per channel
Supply 85-265 Vac; 24Vdc
Calibrated Range 0 – 100% LEL Gasoline
Electrical Classification Safe Area
Enclosure Class IP56

OPTIONS (1) Stainless Steel weather protection cap

PROCESS DATA
Fluid Gasoline Vapour
Operating Temperature Ambient (in air space around tank bund)
Operating Pressure Atmospheric

MANUFACTURERS DATA
Supplier MSA
Model Number: Transmitter GasGard XL Wall Mount Control Unit
Sensor 47K-ST
Weather Cap 10051623

DOCUMENTATION See Attached Documentation Specification

P & I Design Ltd.

Instrument Specification

CLIENT:
Simon Storage
Immingham West Terminal

REV	DATE	BY	CHKD	APPD
A	23.03.11	AMS	MM	MM

CLIENT REF.
Bund G
P & I REF.
SI051001_SPC
SHT 2 OF 3

TAG No.	SERVICE	COMMENTS
AE- G1	Bund G	
AE- G2	Bund G	
AE- G3	Bund G	
AE- G4	Bund G	

CLIENT:
Simon Storage
Immingham West Terminal

REV DATE BY CHKD APPD
A 23.03.11 AMS MM MM

CLIENT REF.
Bund G
P & I REF.
SI051001_SPC
SHT 3 OF 3

Documentation Requirement

Item	Quantity	Description
1.	0	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	0	GENERAL ARRANGEMENT DRAWING Cross-sectioned to show all details necessary for repair and maintenance purposes.
3.	0	MATERIALS TEST CERTIFICATES a. Mechanical. 0 b. Chemical analysis.
4.	0	ITEMISED PARTS LIST Cross-referenced with G.A. drawing(s) and illustrating manufacturers references for all proprietary items such as bearings, oilseals, mechanical seals, etc.
5.	1	RECOMMEND SPARES QUOTATION a. Two years service. b. Commissioning only.
6.	1	INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable. 1 a. Paper Copy 1 b. Electronic copy (Preferably Adobe Acrobat)
7.	0	SOFTWARE a. Programming manual. b. Operating manual.
8.	0	PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.	0	ELECTRICAL a. Schematic and circuit diagrams. b. Certificates of conformity (to include EMC Directive 89/336/EEC). c. Hazardous area certification.
10.	1	INSTRUMENTATION 1 a. Certificates of conformity (to include EMC Directive 89/336/EEC). 1 b. Calibration certificates. 1 c. Hazardous area certification.
11.		SPECIAL REQUIREMENTS

IMPORTANT NOTICE:

Vendors acceptance of this order is conditional on the provision of the Documentation.

Should the vendor not wish to supply the whole or part of the details herein requested, he shall state in writing any exceptions with the quotation or order acceptance.

P & I Design reserve the right to cancel any order where the documentation does not comply with P & I requirements.

No item will be paid in full until documentation specified has been received

###-FMB6.SPC

P & I Design Ltd

Instrument Specification

CLIENT:	REV	DATE	BY	CHKD	APPD	CLIENT REF.
Simon Storage	A	08/04/11	PP	MM	MM	Area 'G' Gas Detection
ISCo West Terminal	B	28.04.11	AMS	MM	MM	P & I REF. SI051003_SPC SHT 1 OF 3

ITEM: Visual Alarm Unit (Electronic)

GENERAL Tag Number See Sheet 2
Service Gas Detection Alarm
Area Classification Zone 1 IIB T4

UNIT Type Multi-Functional LED Beacon
Supply 24Vdc
Case Powder Coated Marine Grade Aluminium
Connections Screwed Terminal
Cable Entry 2 x M20
Mounting Via Adjustable St Steel U Bracket
Enclosure Class IP66
Electrical Classification ATEX II 2 G EEx de IIC T5
ATEX Certification KEMA 00 ATEX 2006

LENS Type Glass with St Steel Gaurd
Colour Blue

OPTIONS

MANUFACTURERS DATA Supplier E2S
Model Number BExBGL1D 24VDC-BL

DOCUMENTATION See attached Documentation Specification

Revision History:

Revision A - Issued for Tender
Revision B – Issued for Procurement

P & I Design Ltd

Instrument Specification

CLIENT:
Simon Storage
ISCo West Terminal

REV	DATE	BY	CHKD	APPD
A	08/04/11	PP	MM	MM
B	28.04.11	AMS	MM	MM

CLIENT REF.
Area 'G' Gas Detection
P & I REF.
SI051003_SPC
SHT 2 OF 3

TAG No.	SERVICE
TBA	Operations Office Beacon
TBA	No.2 Switchroom Beacon

FOR PROCUREMENT

CLIENT:
Simon Storage
ISCo West Terminal

REV	DATE	BY	CHKD	APPD
A	08/04/11	PP	MM	MM
B	28.04.11	AMS	MM	MM

CLIENT REF.
Area 'G' Gas Detection
P & I REF.
SI051003_SPC
SHT 3 OF 3

Documentation Requirement

Item	Quantity	Description
1.	n/a	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	n/a	GENERAL ARRANGEMENT DRAWING Cross-sectioned to show all details necessary for repair and maintenance purposes.
3.		MATERIALS TEST CERTIFICATES
	n/a	a. Mechanical.
	n/a	b. Chemical analysis.
4.	n/a	ITEMISED PARTS LIST Cross-referenced with G.A. drawing(s) and illustrating manufacturers references for all proprietary items such as bearings, oilseals, mechanical seals, etc.
5.		RECOMMEND SPARES QUOTATION
	n/a	a. Two years service.
	n/a	b. Commissioning only.
6.		INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable.
	1	a. Paper Copy
	1	b. Electronic copy (Preferably Adobe Acrobat)
7.	n/a	SOFTWARE
		a. Programming manual.
		b. Operating manual.
8.	n/a	PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.		ELECTRICAL
	n/a	a. Schematic and circuit diagrams.
	n/a	b. Certificates of conformity (to include EMC Directive 89/336/EEC).
	n/a	c. Hazardous area certification.
10.		INSTRUMENTATION
	1	a. Certificates of conformity (to include EMC Directive 89/336/EEC).
	n/a	b. Calibration certificates.
	1	c. Hazardous area certification.
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P & I Design Ltd

Instrument Specification

CLIENT: Simon Storage ISCo West Terminal	REV DATE BY CHKD APPD	CLIENT REF. Area 'G' Gas Detection P & I REF. SI051004_SPC SHT 1 OF 3
	A 08/04/11 PP MM MM	
	B 30/11/11 PP MM MM	

ITEM: Audible
 Alarm Unit
 (Electronic)

GENERAL Tag Number See Sheet 2
 Service Gas Detection Alarm
 Area Classification Zone 1 IIB T4

UNIT Type Multi-Functional Sounder
 Supply 24Vdc
 Case Powder Coated Marine Grade Aluminium
 Connections Screwed Terminal
 Cable Entry 2 x M20
 Mounting Via Adjustable St Steel U Bracket
 Enclosure Class IP66
 Electrical Classification ATEX II 2 G EEx de IIC T4
 ATEX Certification KEMA 99 ATEX 6312

OUTPUT Type
 Indication
 Output: Tone 32 tone selectable
 Level 110 dB

OPTIONS

MANUFACTURERS Supplier E2S
DATA Model Number BExS110D 24DC

DOCUMENTATION See attached Documentation Specification

Revision History:

Revision A - Issued for Purchase
Revision B – ATEX Certificate changed

P & I Design Ltd

Instrument Specification

CLIENT:

Simon Storage
ISCo West Terminal

REV	DATE	BY	CHKD	APPD
A	08/04/11	PP	MM	MM
B	30/11/11	PP	MM	MM

CLIENT REF.

Area 'G' Gas Detection

P & I REF.

SI051004_SPC

SHT 2 OF 3

TAG No.

SERVICE

N/A

Operations Office Sounder

N/A

No.2 Switchroom Sounder

CLIENT:
Simon Storage
ISCo West Terminal

REV	DATE	BY	CHKD	APPD
A	08/04/11	PP	MM	MM
B	30/11/11	PP	MM	MM

CLIENT REF.
Area 'G' Gas Detection
P & I REF.
SI051004_SPC
SHT 3 OF 3

Documentation Requirement

Item	Quantity	Description
1.	n/a	APPROVAL DOCUMENTATION To be supplied before manufacture commences
2.	n/a	GENERAL ARRANGEMENT DRAWING Cross-sectioned to show all details necessary for repair and maintenance purposes.
3.		MATERIALS TEST CERTIFICATES
	n/a	a. Mechanical.
	n/a	b. Chemical analysis.
4.	n/a	ITEMISED PARTS LIST Cross-referenced with G.A. drawing(s) and illustrating manufacturers references for all proprietary items such as bearings, oilseals, mechanical seals, etc.
5.		RECOMMEND SPARES QUOTATION
	n/a	a. Two years service.
	n/a	b. Commissioning only.
6.		INSTALLATION, OPERATING AND MAINTENANCE MANUALS To include calibration instructions where applicable.
	1	a. Paper Copy
	1	b. Electronic copy (Preferably Adobe Acrobat)
7.	n/a	SOFTWARE
		a. Programming manual.
		b. Operating manual.
8.	n/a	PRESSURE VESSELS Calculation sheets, spark test certificates (for lined vessels),hydraulic test certificates.
9.		ELECTRICAL
	n/a	a. Schematic and circuit diagrams.
	n/a	b. Certificates of conformity (to include EMC Directive 89/336/EEC).
	n/a	c. Hazardous area certification.
10.		INSTRUMENTATION
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	n/a	b. Calibration certificates.
	1	c. Hazardous area certification.
11.		SPECIAL REQUIREMENTS

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###-FMB6.SPC

Section 5
Installation Scope of Work



P & I Design Ltd

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SIMON STORAGE
IMMINGHAM WEST TERMINAL
AREA 'G' GAS DETECTION
INSTRUMENT & ELECTRICAL INSTALLATION
INSTALLATION SCOPE OF WORK

Rev	Date	By	Checked	Approved	Description	Client Ref.
A	08/04/11	PP	MM	MM	Issued for Tender	
						Document No. SI051001_INS
						Page 1 of 12

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- 2 GENERAL REQUIREMENTS
- 3 METHODS OF WORK AND MATERIALS
- 4 SCOPE OF WORK
 - 4.1 Scope of Work – Area ‘G’
 - 4.2 Scope of Work – No.2a Switchroom
 - 4.3 Scope of Work – No.3 Switchroom
 - 4.4 Scope of Work – Operations Office
 - 4.5 Contractor Supplied Equipment
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- 5 CONTRACT PRICING CONTENTS
 - 5.1 Introduction Contractor Supplied Equipment
 - 5.2 Pricing Preambles/Notes on Pricing
 - 5.3 Schedule of Rates
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APPENDIX

- I Cable Overview Drawings
- II Schedules & Specifications
- III Standard Specification for Instrument & Electrical Installations

Revision History

Revision A – Original issue for tender.



1 INSTRUCTIONS TO TENDERERS

1.1 Introduction

This document details the scope of work to provide the instrument and electrical installation for the Area ‘G’ Gas Detection Project at Simon Storage Ltd. ISCO West Terminal. It is to be read in conjunction with specification SI002001_INS - Standard Specification for Instrument & Electrical Installations.

The Tender shall be in respect of the proposed works and shall be completed and submitted strictly in accordance with these instructions to Tenderers.

1.2 Date, Time and Mode of Delivery

The completed Tender packages together with any covering letter and with the remainder of the containing document all in originally bound form (taking account of additions/omissions, etc., notified in writing during the Tender period) together with other requirements shall be submitted by the time stated in the Purchaser's Letter of Invitation to Tender.

The envelope must not be marked nor delivered in any way which might disclose the identity of the Tenderer.

1.3 Alterations of Tender Documents

No authorised alteration shall be made in the Tender or the accompanying documents.

1.4 Enquiries to be Made Concerning the Tender

Any query in connection with the Tender shall be submitted to:-

Martin Morgan
P & I Design Limited
2 Reed Street
Gladstone Industrial Estate
Thornaby.
Tel: (01642) 617444
Fax: (01642) 616447
mm@pidesign.co.uk

If a site visit is required to ensure that the work associated with this project is fully understood then this is to be organised by contacting Martin Morgan at P & I Design Ltd.



1.5 Sufficiency of Tender

Before submitting a Tender the Tenderer should obtain all information, familiarise himself with means of access, location, extent and nature of the Site, extent and nature of the Services to be provided, conditions under which the Services and Works will be carried out, conditions affecting supply of staff and labour and any other matters which may affect his Tender. Applications for costs etc. on the ground of lack of knowledge in any respect of the aforementioned will be refused.

1.6 Confidentiality

The particulars of this document and any Tender submitted in respect hereof are private and confidential and shall not be used for any purpose other than the proposed contract. In the event of a Tender not being submitted or accepted all documents and drawings shall be returned to the person named in Clause 4 of these Instructions to Tenderers.

1.7 Contravention of Tender Requirements

Contravention of any of the requirements of these Instructions to Tenderers with regard to tendering shall render any Tender concerned liable to disqualification at the sole discretion of Simon Storage. Ltd.

1.8 Contract Agreement

The Contractor shall, when called upon, enter into and execute a Contract agreement.

1.9 Information to be Supplied by the Purchaser

In addition to the information to be provided by the Purchaser prior to the Contract award the Tenderer shall attach a Schedule of any further information which may be required from the Purchaser, together with a programme indicating when it will be required.

1.10 Tender Price

The Contractor shall make his Tender open for acceptance for a period of one month from date of receipt by the Purchaser.



2 GENERAL REQUIREMENTS

Detailed in document SI002001.INS - Standard Specification for Instrument & Electrical Installation Section 2 with the following additional information -

A “For Construction” package will be issued prior to contract. Modifications from the “for Tender” package will be highlighted.

The contractor is to supply details of labour usage to complete the installation on programme. The contractor shall also supply day rate costs.

Normal site working hours 8AM to 6PM Monday to Friday.



3 METHODS OF WORK AND MATERIALS

Detailed in document SI002001.INS - Standard Specification for Instrument & Electrical Installation Section 3 with the following additional information -

Section 3.5 – Segregation of Service

The schedules will indicate cables exceeding 110V AC.

Section 3.6 – Fixings

No fixings shall be made to the bund walls.

Section 3.11.1 – Testing

No commissioning will commence until handover of cable test certificates and CompEx inspections by the contractor. The contractor will be responsible for providing installation handover to the engineer in good time to progress the commissioning programme.

Section 3.11.2 – Commissioning

The contractor will not be required to carry out commissioning. The contractor will not power any equipment without the consent of the engineer.

Pneumatics

The contractor shall supply all labour and materials to install the pneumatic supplies to all actuated valves utilising 6mm OD black PVC tubing and push in fittings. Each tube shall be identified with durable, non-corrodible tags, of the Critchley K type or equivalent, inscribed with the valve tag number and fixed securely to the tube.

A distribution Manifold will be installed by the mechanical contractor within 10 metres of the valve. The contractor shall use this length for his costing for every valve.



4 SCOPE OF WORK

The scope of work is as detailed in the following sections and as shown on the documentation listed below.

Equipment Layout Drawing	SI051001_DWG
Cable Overview	SI051002_DWG
Gas Sensors Loop Sheet	SI051005_DWG
Cable Schedule	SI051001_SCH

No.2a Switchroom Modified Drawings

Logic Panel Internal Layout	SI109211_DWG Rev C
Logic Panel Power Distribution	SI109215_DWG Rev C
Logic Panel Drawing 2	SI109216_DWG Rev C

4.1 Scope of Work – Area ‘G’

The works comprise, briefly :-

- Mounting the free issue gas sensors in locations shown on the drawings. The sensors are to be positioned such that the sensor inlet is approximately 300mm above grade. Final positions to be agreed with the engineer.
- Supply & install all cabling and containment.

4.2 Scope of Work – No.2a Switchroom

The works comprise, briefly :-

- Mount the free issue GasGard controller on the wall. The controller is to be mounted on the wall near the pedestrian entrance
- Mount the free issue beacon & sounder outside the switchroom. The beacon and sounder shall be positioned such that the beacon is visible from for the maximum distance possible.

4.3 Scope of Work – No.3 Switchroom

The works comprise, briefly :-

- Locate the existing spare 2 pair cable from the high level alarm panel to the operations office
- Re-ferrule the cable as shown.
- Connect the cable from No.2a switchroom.

4.4 Scope of Work – Operations Office

The works comprise, briefly :-

- Mount the free issue beacon & sounder outside the Operations Office. The beacon to be located close to existing alarm beacons
- Complete panel wiring as shown on drawings
- Re-ferrule the cable as shown.
- Supply & install cables to the beacon & sounder.



4.5 Contractor Supplied Equipment

There is no equipment to be supplied

4.6 Free Issue Equipment

The contractor shall supply labour and materials to take delivery, offload and position the following free issue equipment. Equipment requiring a direct connection into the process lines will be mechanically completed by others.

- 1 off GasGard Wall Mounting Control Unit
- 4 off Gas Sensor Units
- 2 off Alarm Beacons
- 2 off Alarm Sounders



5 CONTRACT PRICING CONTENTS

5.1 Introduction

The Tenderer must complete the Schedules attached, completing the lists of categories of unit rates for variations. The Tenderer must not re-type or make any other alterations to the wording.

Engineer authorised variations in respect of the provision of the aforementioned services to be paid in accordance with Section 5.3.4.

Payment under hourly/day rates for variations to Contract will only be made to the Contractor for Personnel approved by the Purchaser and will only be made in respect of all approved hours worked, or pro-rata to the nearest half hour, half day or whole day respectively.

5.2 Pricing Preambles/Notes on Pricing

5.2.1 General

These Pricing Preambles relate to Rates, Sums and Amounts entered in Schedules which form part of the Contract.

In arriving at said Rates, Sums and Amounts, the Contractor will be deemed to have taken account of the Conditions of Contract, the Specification/Scope of Work, the Particular Specification, these Pricing Preambles and any other matters which affects said Rates, Sums and Amounts.

Rates, Sums and Amounts, except where otherwise provided in the Contract shall be fixed for the duration of the Contract.

Completion of Lump Sums, Normal Time Rates.

- 5.2.1.1** A Rate, Sum or Amount shall be entered by the Contractor against each reference or item and reference or items against which no Rate, Sum or Amount is entered shall be deemed to be covered by other Rates, Sums or Amounts entered elsewhere in the Schedules.
- 5.2.1.2** The Contractor shall omit from his Tender any Value Added Tax chargeable or any taxable supplies made under Contract to the Purchaser and payable by him as a taxable person to the Commissioners of Customs and Excise.
- 5.2.1.3** The Contractor shall allow for compliance in all respects with the applicable British Standard, Codes of Practice and any other Standards or Codes specified. The Contractor shall be fully responsible for obtaining such documents and familiarising himself with same.
- 5.2.1.4** The Contractor shall allow for compliance with all statutory safety regulations, including those of the Purchaser, and executing the Services in such an order or sequence as may be required to accord with the overall Project programme requirements.



5.3 Schedule of Rates

5.3.1 General

5.3.1.1 Schedule of Rates

A schedule of rates is to accompany the tender.

5.3.1.2 Man-hours

The Man-hour Rates which the Contractor inserts in the Schedule shall be deemed to include, but not necessarily be restricted to all allowances required for the following:

All cost associated with the employment of labour including the requirements of Government enactment's (V.A.T. excepted) and/or other suitable National Working Rule Agreement.

Supervision by non-working trade supervisors, other than those allowed separately by the Contractor in the General Preliminaries section of the Tender.

All man-hours and costs associated with collecting "Free Issue" materials from the Purchaser's stores or compounds and transporting to the Contractor's store or workshop, including all loading, unloading, stacking and storage. Also any costs associated with off-loading, stacking and storage of materials supplied by the Contractor. Compilation of stores record system and final reconciliation for all "Free Issue" materials. Generally this store will be located on the site.

Loading and transporting from the Contractor's store or compound and assembling and installing in the final position.

The installation of all work and operations required by the Specifications and Works Rules and Regulations.

The carrying out of any tests including submission of samples where required. Any necessary site measurement and sketching for fabrication and erection purposes.

Marking up construction drawings to record the "As Built" installation.

All necessary allowances for small hand tools and consumables which are not included as Constructional Plant in the General Preliminaries section of the Tender.

Protecting the works during construction period from damage and for making good /reinstating damage caused.

All required allowances for overhead and profit.



5.3.2 Materials

The material prices which the Contractor inserts in the Schedule of Rates shall be deemed to include the following:-

All costs associated with delivery to the Contractor's site stores or compound.

Any demurrage charges or costs associated with returning packing cases, drums and the like for materials supplied by the Contractor.

All necessary allowances for waste.

All necessary allowances for consumables.

All necessary fixing devices.

5.3.3 Testing

The man-hour rates shall include for all testing.

5.3.4 Schedule of Day work Rates

Variations shall be valued on a lump sum basis. Such lump sums shall be derived from the Schedule of Rates below and the man-hour estimates for the variations which the Engineer has agreed in writing and all of which shall be subject to the issue of a Variation Order.

Position	40 Hour Rate	Time & ½ Rate	Double Time
Site Supervision			
Working Foreman			
Approved Electrician			
Labourer			

Percentage to be added to net cost of materials %

Site Establishment

Cost inclusive of site management, office facilities, £
messing, toilets and constructional equipment at a
weekly rate.



5.4 Programme

5.4.1 Provisional Programme

The following information is supplied for the guidance of the Tenderer and is provisional only, based upon the information available at the time of issue of the Tender:

1. Tender required by – TBA Simon Storage
2. Earliest date on which order can be placed – TBA Simon Storage
3. Free issue equipment available – week commencing 9th May 2011
4. Latest date for completion, including all testing - TBA Simon Storage

The tenderer shall include a provisional programme with the tender to include key milestones for delivery of equipment within their supply.



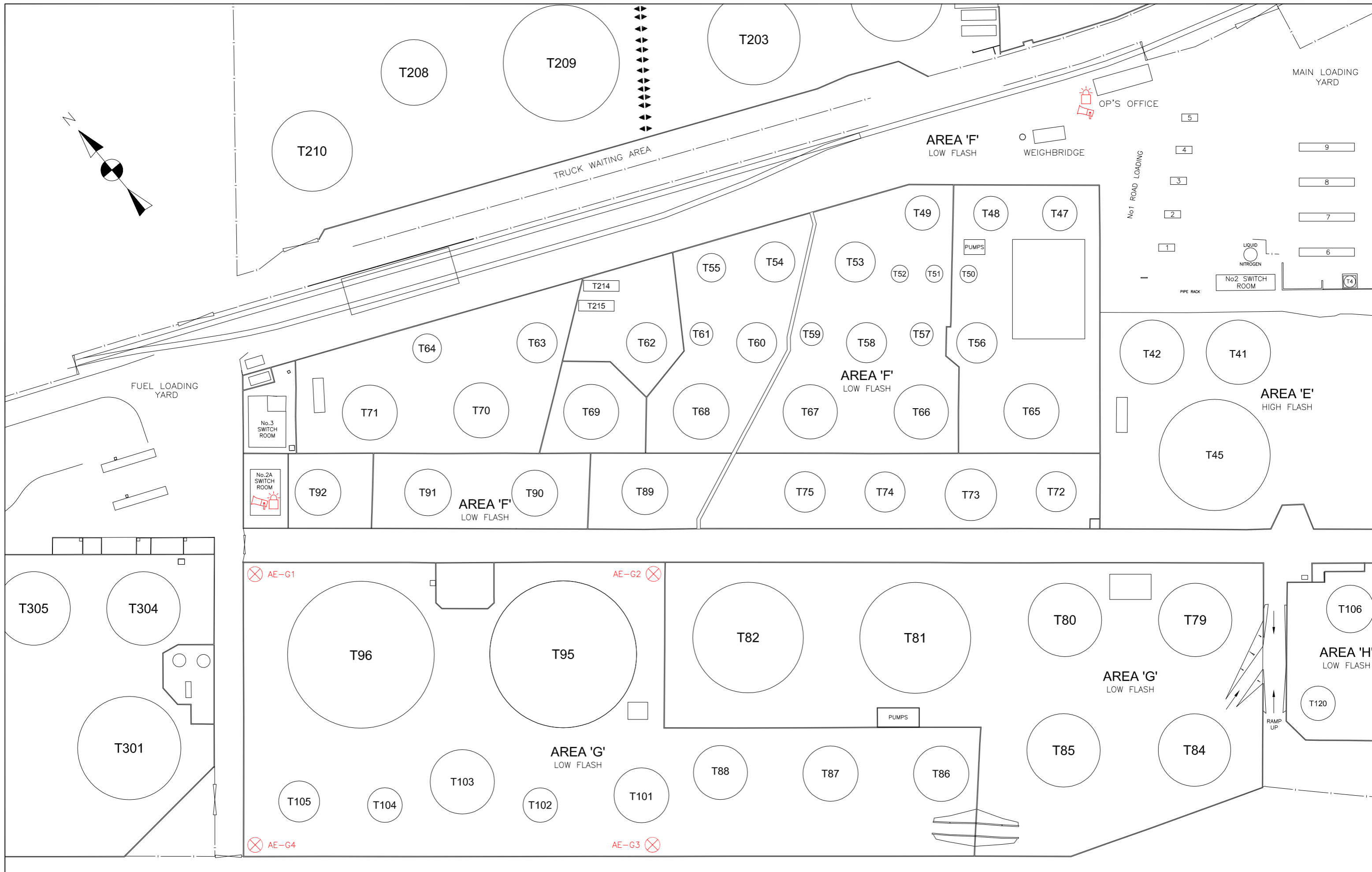
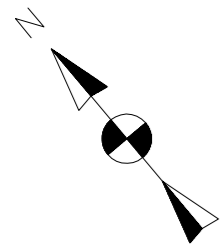
Appendix I

Drawings

SI051001_DWG Rev B
SI051002_DWG Rev A
SI051005_DWG Rev A

SI109211_DWG Rev C
SI109215_DWG Rev C
SI109216_DWG Rev C





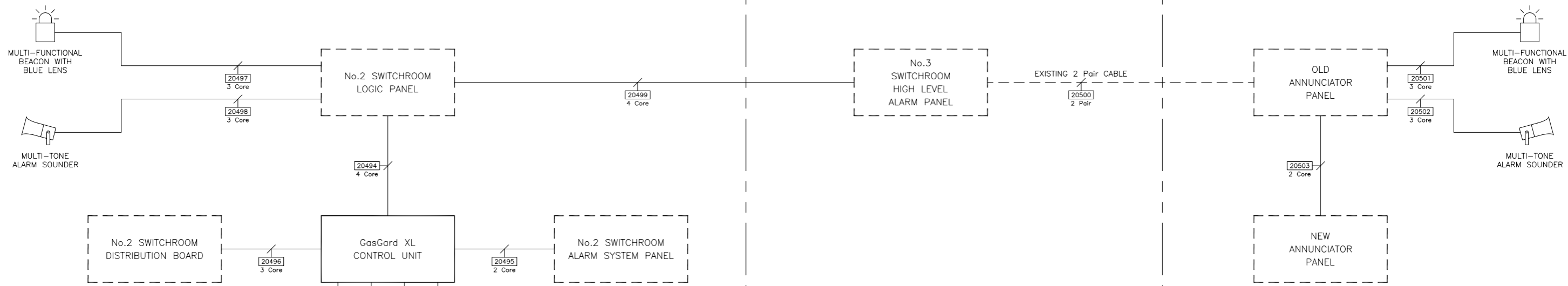
- KEY:-
- GAS SENSOR - ⊗
 - AUDIBLE ALARM - 🔊
 - VISUAL ALARM - 🚨



IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED

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A	01/03/11	P.P.	P.P.	M.M.	M.M.	ISSUED FOR INFORMATION
B	05/05/11	P.P.	P.P.	M.M.	M.M.	LOCATION OF SENSORS REVISED

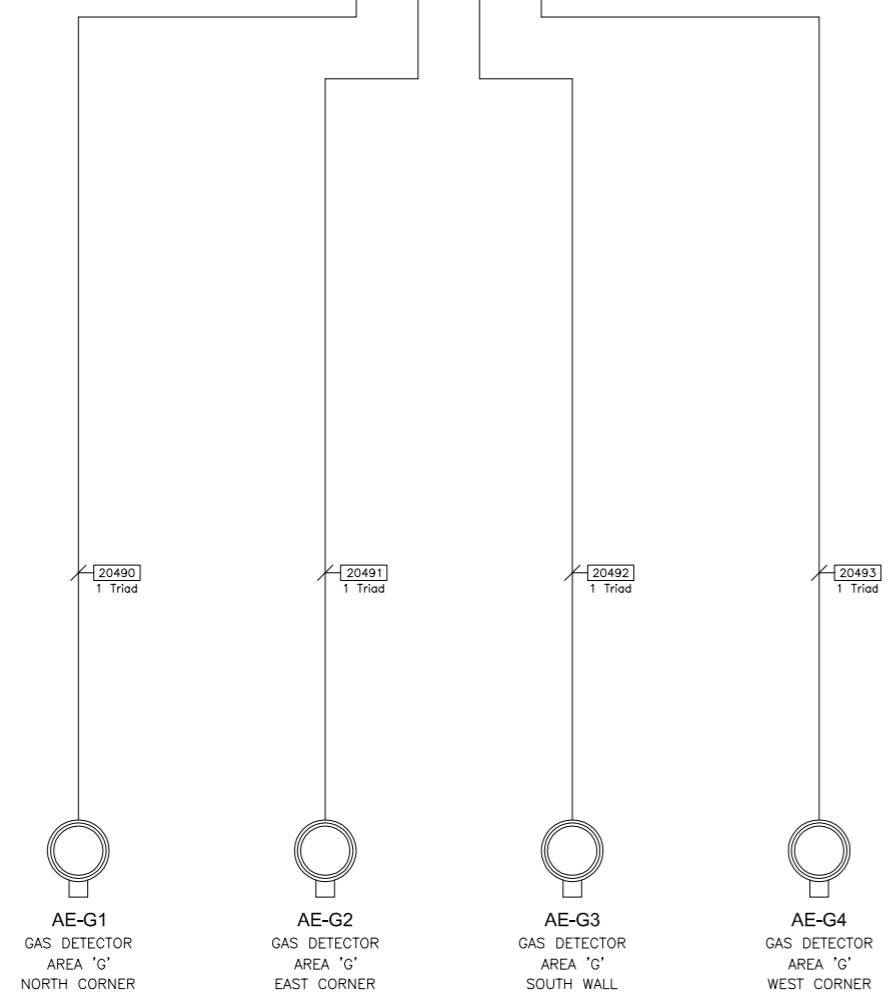
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TITLE	BUND 'G' GAS DETECTION EQUIPMENT LAYOUT		
		 P & I Design Ltd Tel: 01642 617444 www.pidesign.co.uk	
		SHEET 1 OF 1	P&I DRG No. SI051001_DWG
CLIENT DRG. No.			



No.2 SWITCHROOM
HAZARDOUS AREA

No.3 SWITCHROOM

OPERATIONS OFFICE



NOTES
1) EXISTING PANELS & CABLES SHOWN : - - - - -



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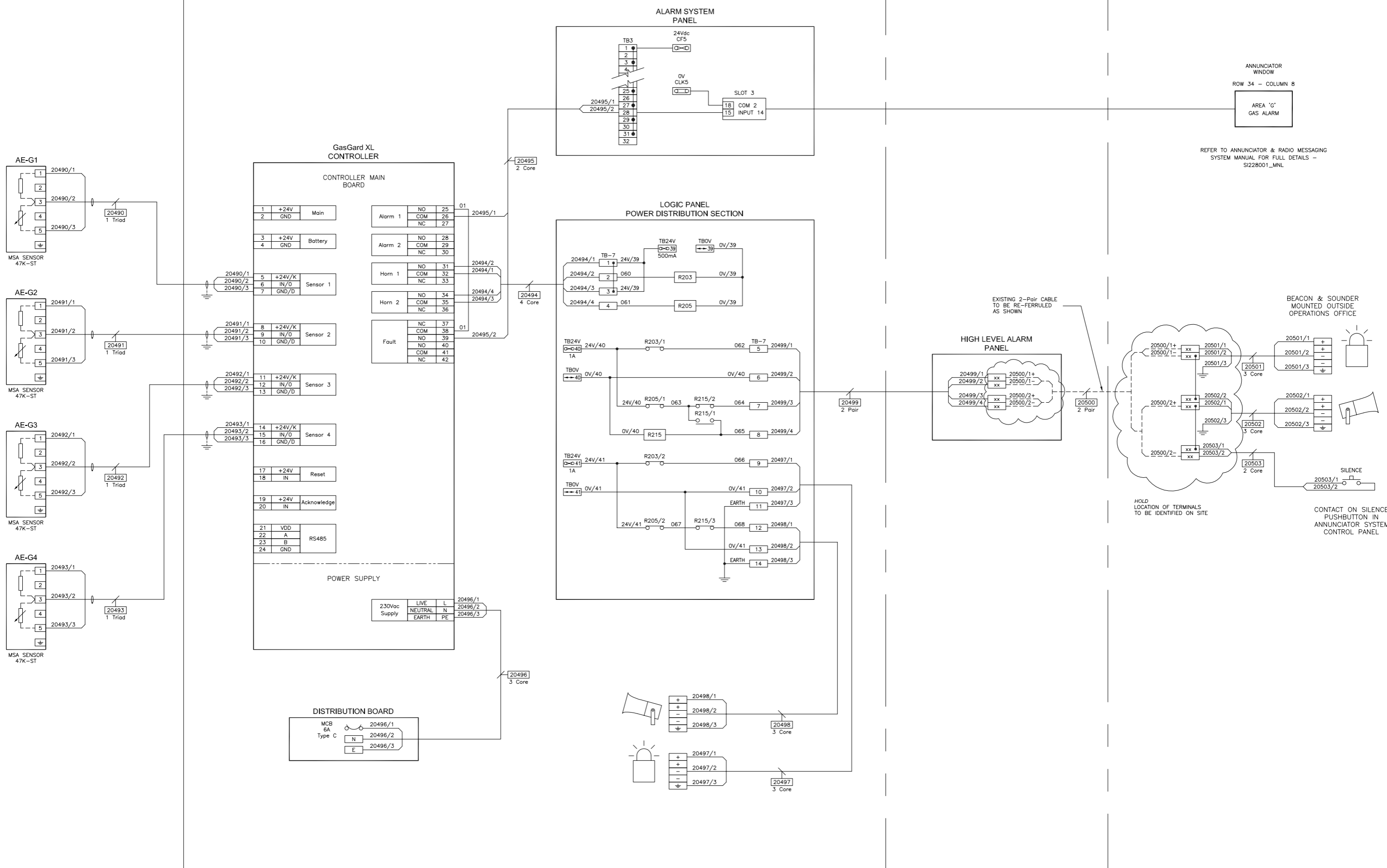
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A	05/05/11	P.P.	P.P.	M.M.	M.M.	ISSUED FOR TENDER

PLANT	IMMINGHAM STORAGE Co. - WEST TERMINAL
TITLE	BUND 'G' GAS DETECTION PROJECT CABLE OVERVIEW
CLIENT DRG. No.	P&I DRG No. SI051002_DWG

IMMINGHAM STORAGE Co. Ltd.
IMMINGHAM WEST TOWN,
WEST RIVERSIDE,
IMMINGHAM DOCK,
IMMINGHAM,
SOUTH HUMBERSIDE
DN40 2PD

P & I Design Ltd
Tel. 01642 617444
www.pidesign.co.uk

SHEET 1 OF 1



ANNUNCIATOR WINDOW
ROW 34 - COLUMN 8
AREA 'G'
GAS ALARM

REFER TO ANNUNCIATOR & RADIO MESSAGING SYSTEM MANUAL FOR FULL DETAILS - SIZ28001_MNL

BEACON & SOUNDER MOUNTED OUTSIDE OPERATIONS OFFICE

HIGH LEVEL ALARM PANEL

HOLD LOCATION OF TERMINALS TO BE IDENTIFIED ON SITE

CONTACT ON SILENCE PUSHBUTTON IN ANNUNCIATOR SYSTEM CONTROL PANEL

CERTIFIED EQUIPMENT

TAG No.	CERTIFICATE No.	ATEX CERTIFICATION	I.S. CALCULATION
AE-G1	INERIS 03 ATEX 0208	Ex II 2 G EEx d IIC T4/T6	N/A
AE-G2	INERIS 03 ATEX 0208	Ex II 2 G EEx d IIC T4/T6	N/A
AE-G3	INERIS 03 ATEX 0208	Ex II 2 G EEx d IIC T4/T6	N/A
AE-G4	INERIS 03 ATEX 0208	Ex II 2 G EEx d IIC T4/T6	N/A

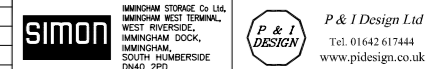
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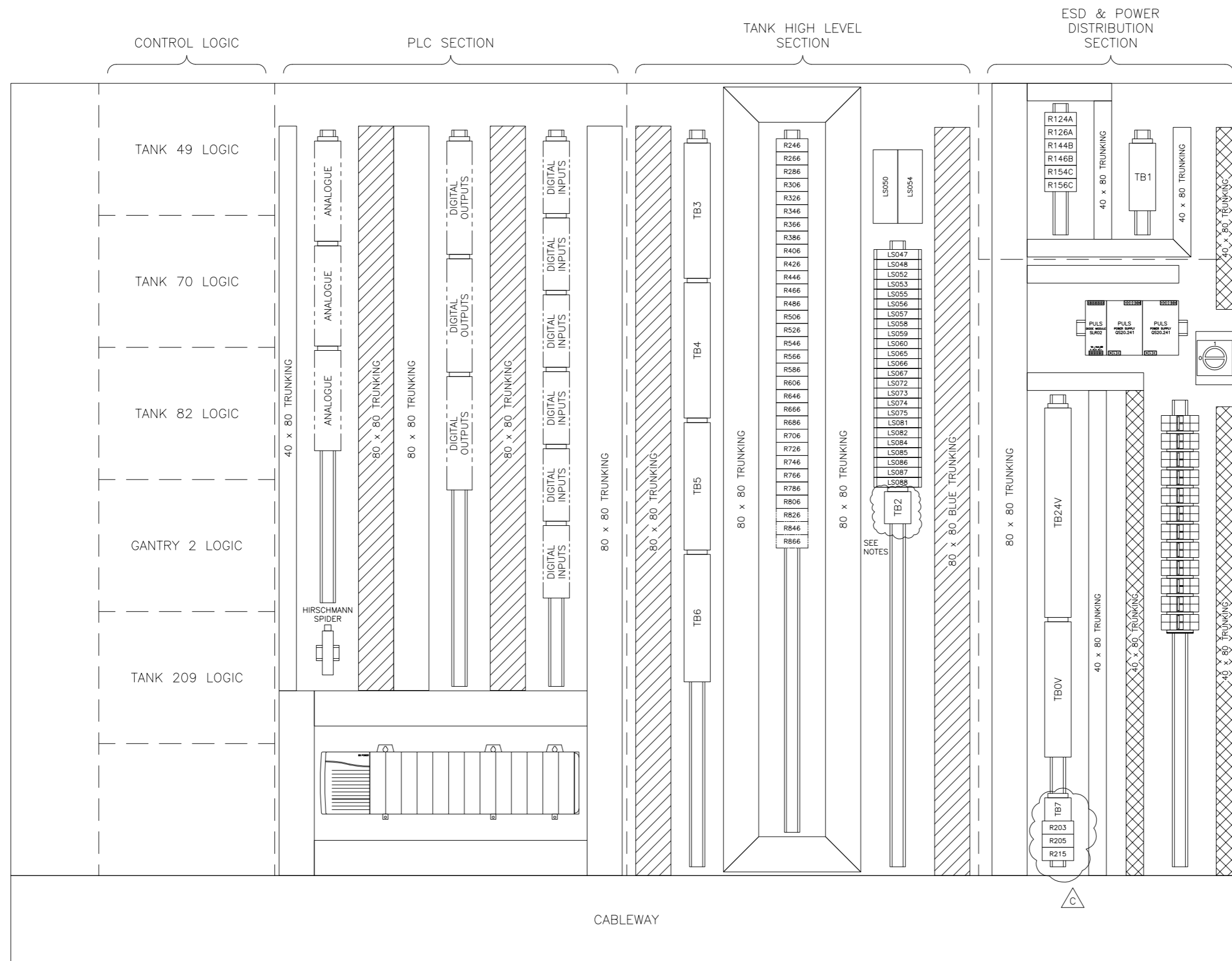
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A	05/05/11	P.P.	P.P.	M.M.	M.M.	ISSUED FOR CONSTRUCTION

PLANT	IMMINGHAM STORAGE Co. - WEST TERMINAL
TITLE	BUND 'G' GAS DETECTION PROJECT GAS SENSORS LOOP SHEET
CLIENT DRG. No.	P&I DRG No. SI051005_DWG



NOTES

- 1) FOR TERMINAL BLOCK TYPE & QUANTITY SEE RELEVANT LOGIC DRAWINGS
- 2) TB2 : 6-off WEIDMULLER WDU 2.5 (102000000)
EACH BANK OF 4-off TERMINALS TO BE REPLACED BY A NIVOTESTER IN FUTURE. TERMINALS TO BE SPACED ACCORDINGLY.
- 3) RESERVED SPACE FOR FUTURE USE SHOWN :- -----



WIRING DETAILS

DESCRIPTION

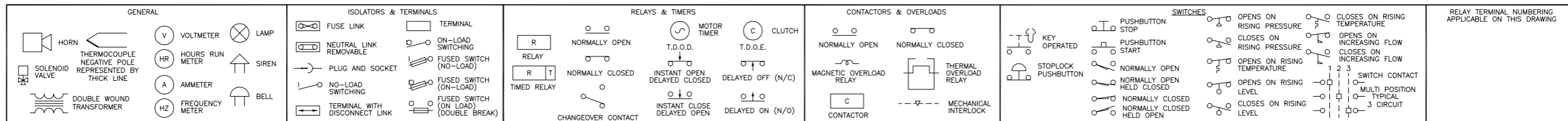
ELECTRICAL 440V / 240V AC:	
SIZE:	n/a
COLOUR:	n/a
INSTRUMENT 230vac SUPPLIES:	
SIZE:	Suitably Rated with Minimum 0.5mm ²
COLOUR:	Live (Brown) / Neutral (Blue) / Earth (Green/Yellow)
INSTRUMENT 110Vdc SUPPLIES:	
SIZE:	n/a
COLOUR:	n/a
24V DC SUPPLIES:	
SIZE:	Suitably Rated with Minimum 0.5mm ²
COLOUR:	Positive (Red) / 0V (Black)
DIGITAL SWITCHED AC:	
SIZE:	n/a
COLOUR:	n/a
DIGITAL SWITCHED DC:	
SIZE:	0.5mm ²
COLOUR:	White
ANALOGUE:	
SIZE:	0.5mm ²
COLOUR:	Grey
CRIMPS:	
TYPE:	Bootlace or Twin Grip Insulated
FERRULES:	
TYPE:	Heat Shrink Thermal Printed Sleeves

- GREY TRUNKING – FIELD CABLES (24Vdc)
- BLACK TRUNKING – 230Vac
- GREY TRUNKING – PANEL WIRING (24Vdc)

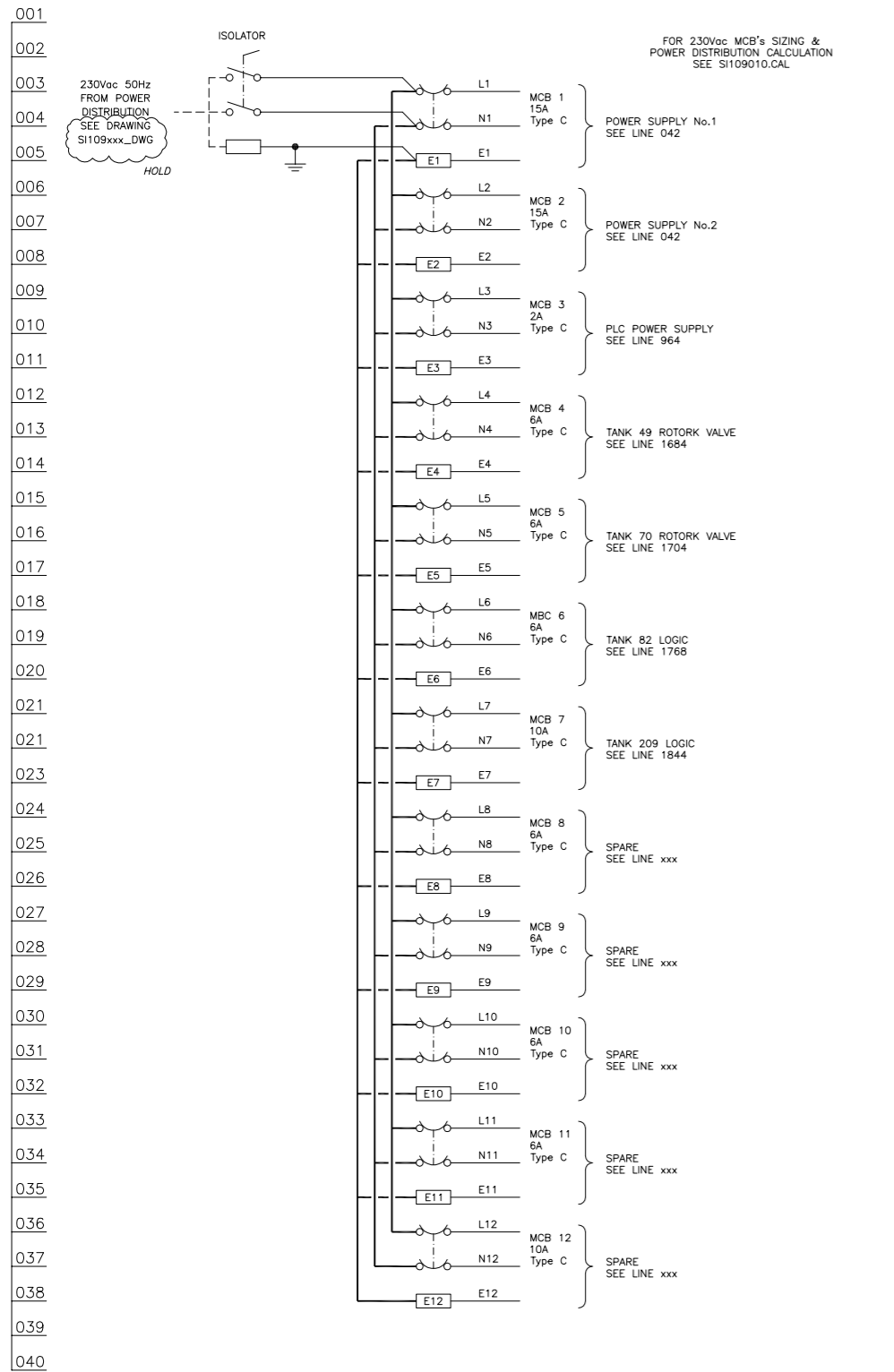
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B	15/04/10	P.P.	P.P.	D.B.F	D.B.F	M.M. M.M. ISSUED FOR CONSTRUCTION
C	05/05/11	P.P.	P.P.	M.M.	M.M.	GAS ALARM LOGIC ADDED

PLANT	IMMINGHAM STORAGE Co. – WEST TERMINAL
TITLE	No.2 SWITCHROOM – LOGIC PANEL INTERNAL LAYOUT
<small>IMMINGHAM STORAGE CO. LTD. WEST RIVERSIDE, IMMINGHAM DOCK, IMMINGHAM, SOUTH HUMBERSIDE DN40 2PD</small>	
<small>P & I Design Ltd Tel. 01642 617444 www.pidesign.co.uk</small>	
CLIENT DRG. No.	P&I DRG No. SI109211_DWG

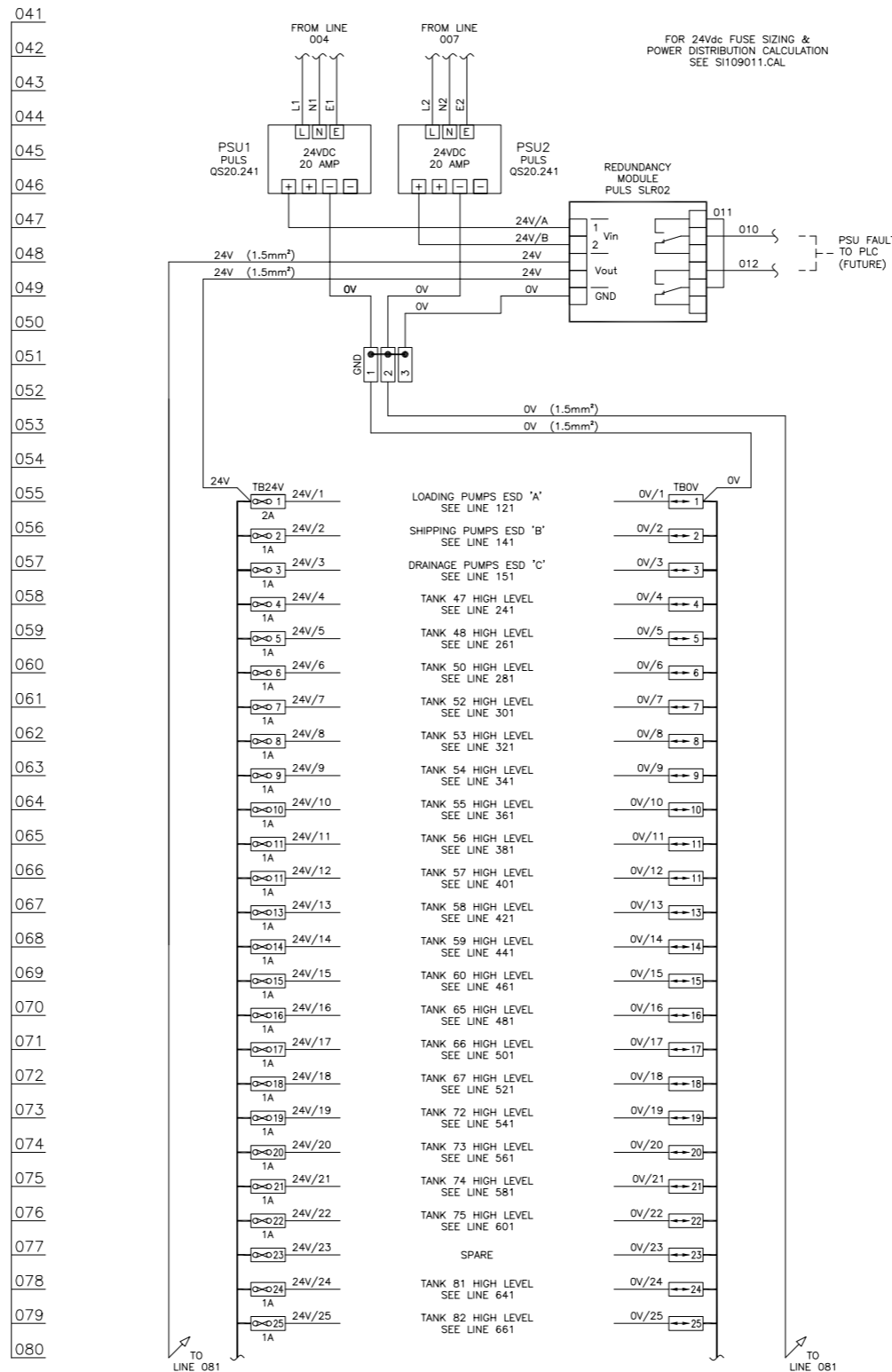


230Vac POWER DISTRIBUTION



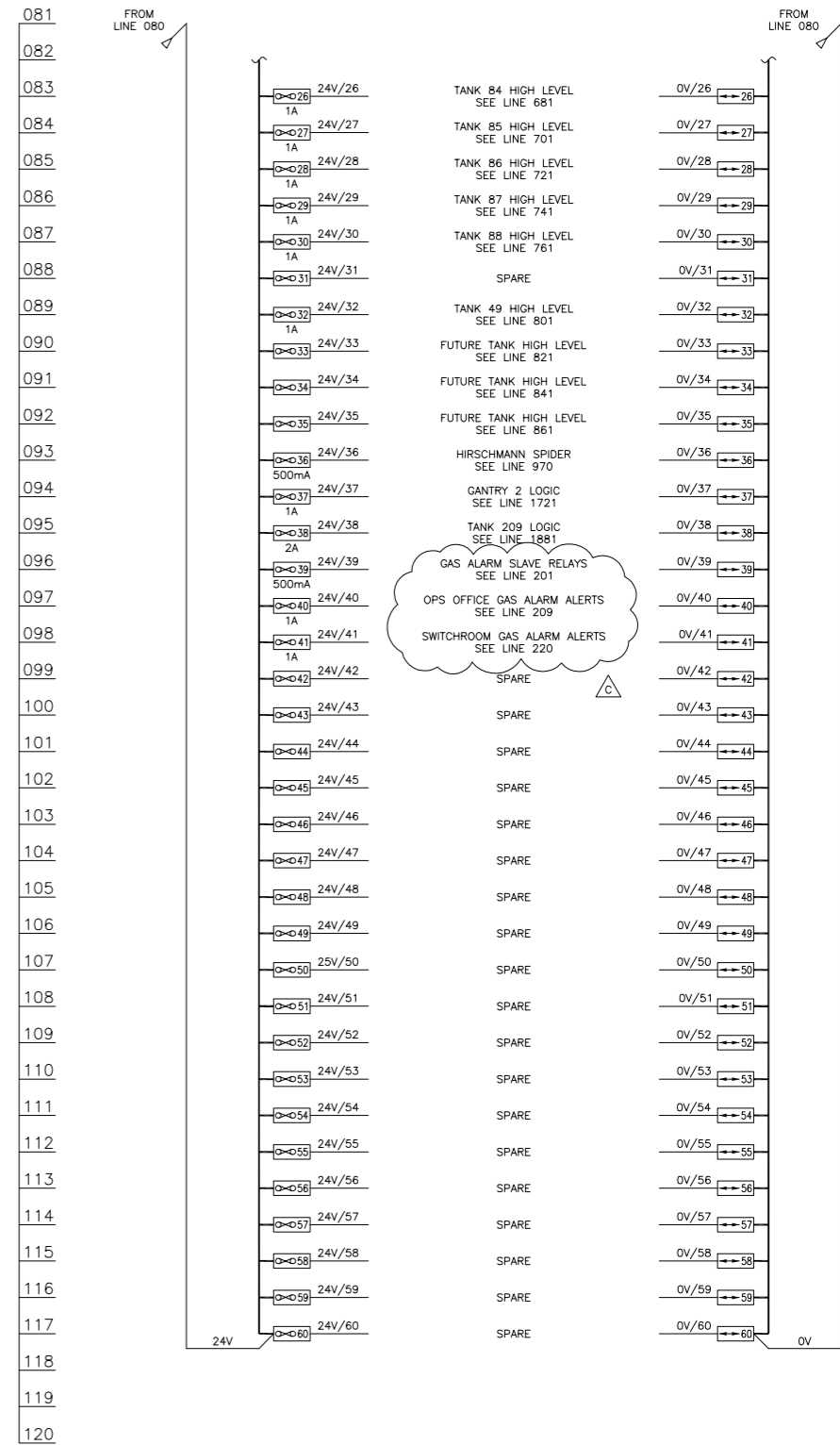
LAST NUMBER USED : xxx
SPARE TO : 009

24Vdc POWER DISTRIBUTION



LAST NUMBER USED : 012
SPARE TO : 019

24Vdc POWER DISTRIBUTION



NOTES

- 1) TB24V : 60-off WEIDMULLER WSI 6 (1011000000)
- 2) TBOV : 60-off WEIDMULLER WTR 2.5 (1855610000)



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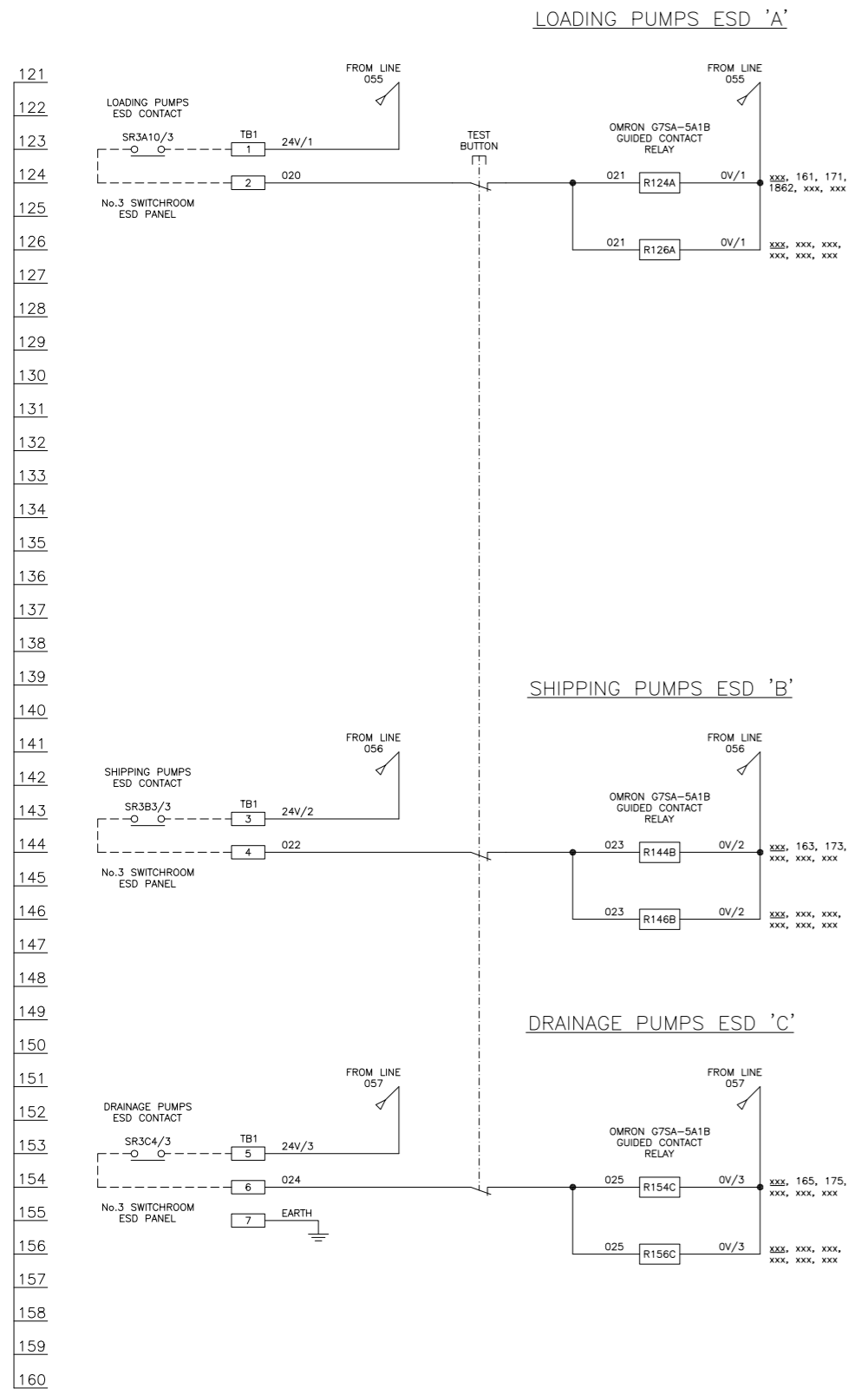
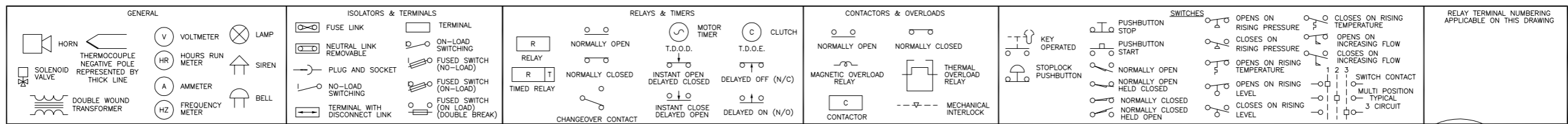
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B	30/04/10	P.P.	P.P.	D.B.F	D.B.F	M.M. M.M. ISSUED FOR CONSTRUCTION
C	05/05/11	P.P.	P.P.	M.M.	M.M.	FUSES ALLOCATED FOR GAS ALARMS

PLANT: IMMINGHAM STORAGE Co. - WEST TERMINAL
TITLE: No.2 SWITCHROOM - LOGIC PANEL
DRAWING 1 : POWER DISTRIBUTION

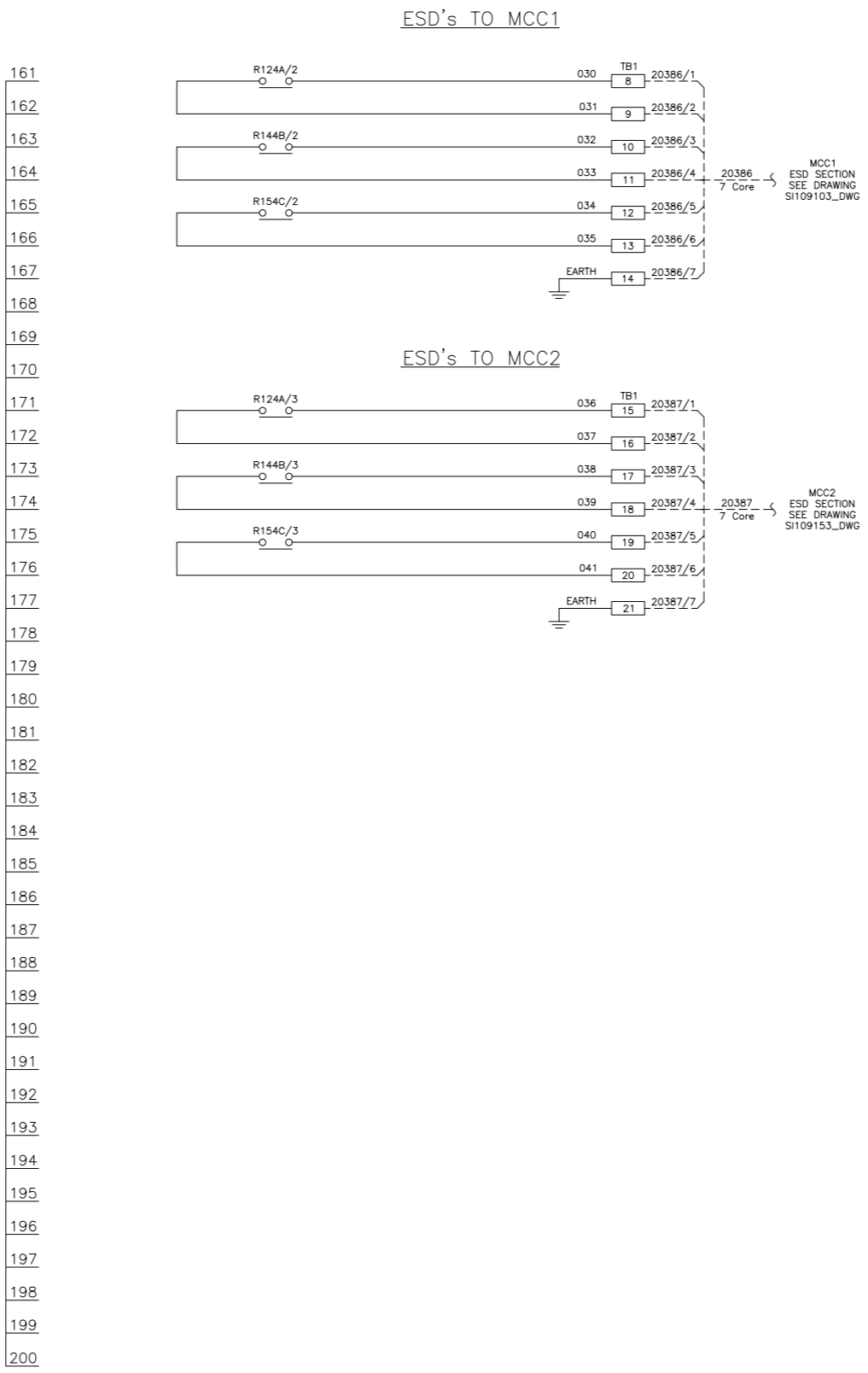
IMMINGHAM STORAGE CO. LTD.
IMMINGHAM WEST TERMINAL
WEST RIVERSIDE,
IMMINGHAM DOCK,
IMMINGHAM,
SOUTH HUMBERSIDE
DN40 2PD

P & I DESIGN
P & I Design Ltd
Tel. 01642 617444
www.pidesign.co.uk

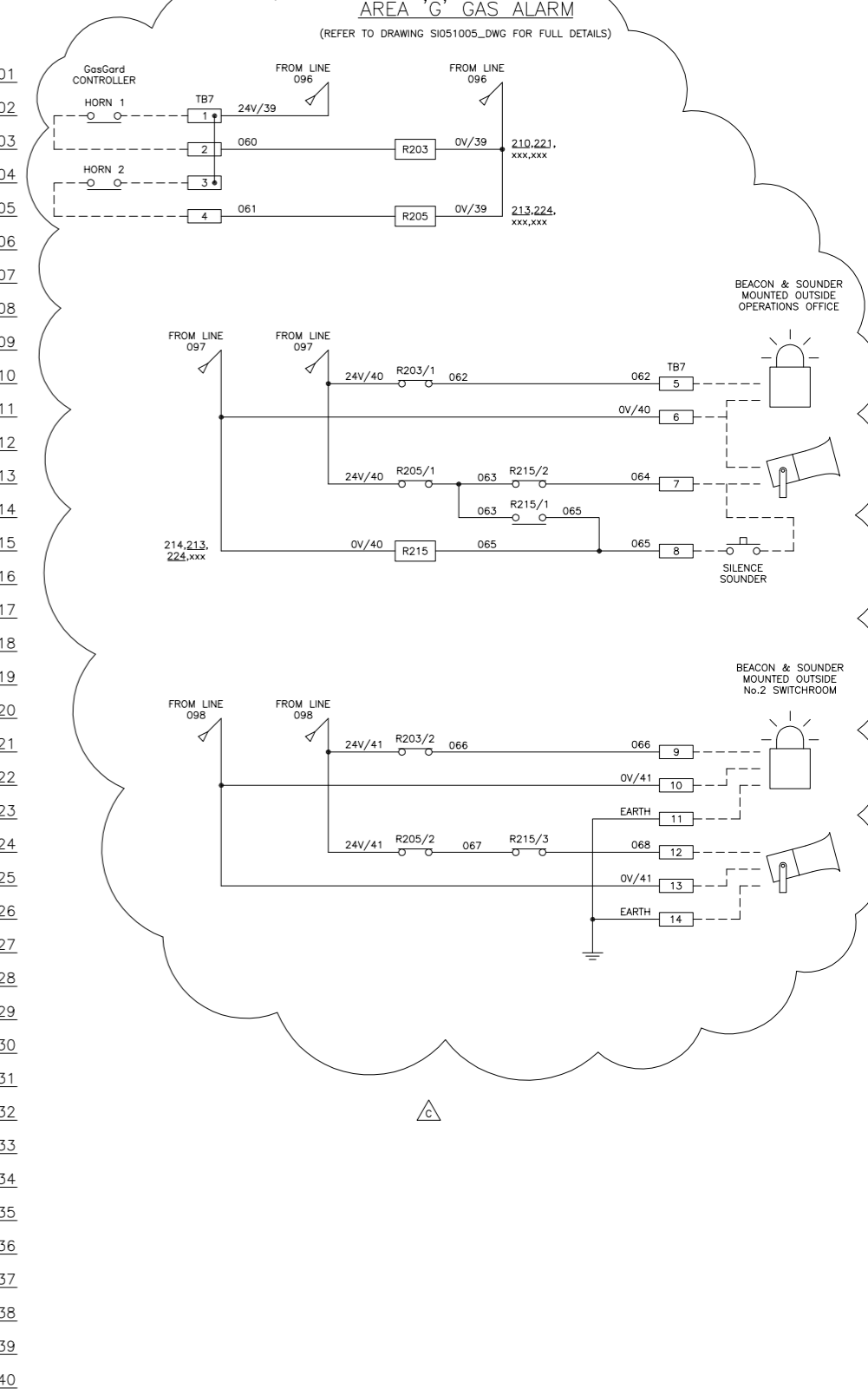
SHEET 1 OF 1
CLIENT DRG. No. P&I DRG No. S1109215_DWG



LAST NUMBER USED : 025
 SPARE TO : 029



LAST NUMBER USED : 041
 SPARE TO : 059



LAST NUMBER USED : 068
 SPARE TO : 099

NOTES
 1) TB1 : 30-off WEIDMULLER WDU 2.5 (1020000000)
 2) TB7 : 14-off WEIDMULLER WDU 2.5 (1020000000)



IF NOT SIGNED THIS DOCUMENT IS UNCONTROLLED							PLANT	
REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION	IMMINGHAM STORAGE Co. - WEST TERMINAL	
A	16/03/10	P.P.	P.P.	D.B.F	D.B.F	M.M. M.M.	No.2 SWITCHROOM - LOGIC PANEL	
B	30/04/10	P.P.	P.P.	D.B.F	D.B.F	M.M. M.M.	DRAWING 2 : ESD'S	
C	05/05/11	P.P.	P.P.	M.M.	M.M.	M.M.	GAS ALARM LOGIC ADDED	

	IMMINGHAM STORAGE Co. Ltd. IMMINGHAM WEST TERMINAL WEST RIVERSIDE, IMMINGHAM COOK, IMMINGHAM, SOUTH HUMBERSIDE DN40 2PD	P & I Design Ltd Tel. 01642 617444 www.pidesign.co.uk
	SHEET 1 OF 1 CLIENT DRG. No. P&I DRG No. S1109216_DWG	

Appendix II

Schedules & Specifications

SI051001_SCH Rev A

Cable Specification - Type 'G'
Cable Specification - Type 'J'



INSTRUMENT/ELECTRICAL CABLE SCHEDULE

CABLE		CONDUCTORS		CABLE ROUTE				APPROX. LENGTH METRES	REMARKS
REFERENCE	TYPE	AREA mm ²	No.	FROM	GLAND TYPE	TO	GLAND TYPE		
20490	G01	1.5	1 Triad	Gas Sensor 1 Area 'G' (North Corner)	ATEX II EExde	No.2 Switchroom GasGard Control Unit	ATEX II EExde		
20491	G01	1.5	1 Triad	Gas Sensor 2 Area 'G' (East Corner)	ATEX II EExde	No.2 Switchroom GasGard Control Unit	ATEX II EExde		
20492	G01	1.5	1 Triad	Gas Sensor 3 Area 'G' (South Wall)	ATEX II EExde	No.2 Switchroom GasGard Control Unit	ATEX II EExde		
20493	G01	1.5	1 Triad	Gas Sensor 4 Area 'G' (West Corner)	ATEX II EExde	No.2 Switchroom GasGard Control Unit	ATEX II EExde		
20494	J04	1.5	4 Core	No.2 Switchroom GasGard Control Unit	ATEX II EExde	No.2 Switchroom Logic Panel	ATEX II EExde		
20495	J02	1.5	2 Core	No.2 Switchroom GasGard Control Unit	ATEX II EExde	No.2 Switchroom Alarm System Panel	ATEX II EExde		
20496	J03	2.5	3 Core	No.2 Switchroom GasGard Control Unit	ATEX II EExde	No.2 Switchroom Distribution Board	ATEX II EExde		
20497	J03	1.5	3 Core	No.2 Switchroom Logic Panel	ATEX II EExde	No.2 Switchroom Alarm Beacon	ATEX II EExde		
20498	J03	1.5	3 Core	No.2 Switchroom Logic Panel	ATEX II EExde	No.2 Switchroom Alarm Sounder	ATEX II EExde		
20499	J04	1.5	4 Core	No.2 Switchroom Logic Panel	ATEX II EExde	No.3 Switchroom High Level Panel	ATEX II EExde		
20500			2 Pair	No.3 Switchroom High Level Panel	ATEX II EExde	Operations Office Old Annunciator Panel	ATEX II EExde	Existing Cable	
20501	J03	1.5	3 Core	Operations Office Old Annunciator Panel	ATEX II EExde	Operations Office Alarm Beacon	ATEX II EExde		
20502	J03	1.5	3 Core	Operations Office Old Annunciator Panel	ATEX II EExde	Operations Office Alarm Sounder	ATEX II EExde		
20503	J02	1.5	2 Core	Operations Office Old Annunciator Panel	ATEX II EExde	Operations Office New Annunciator Panel	ATEX II EExde		
20504									
20505									
20506									
20507									
20508									
20509									

CHECK MASTER SCHEDULE BEFORE USING ANY FURTHER NUMBERS

ALL MODIFICATIONS TO BE MADE ON MASTER SCHEDULE SI002002_SCH AND COPIED ONTO THIS SCHEDULE

TOTAL



NOTES:

1) Refer to P&I Design Cable Specifications for details on Cable Type.

- Denotes Cable Modified
- Denotes Cable Deleted
- Denotes Cable Added
- Future Cables

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REV	DATE	BY	DRN	CHK'D	APP'D	DESCRIPTION
A	05/05/11	PP	PP	MM	MM	Issued for Tender

PLANT	ISCo West - No.2 Switchroom
TITLE	Area 'G' Gas Detection - Cable Schedule
	
	
CLIENT DRG No	REF No. SI051001_SCH

TYPE	J
DESCRIPTION	XLPE Insulated Power Cable - Armoured
MANUFACTURING SPECIFICATION	BS5467
SERVICE	Power Distribution / Control (Max. 440V ac.)
VOLTAGE	600/1000V.
CONDUCTORS	Stranded Copper
INSULATION	XLPE (Cross Linked Polyethylene)
CORE COLOUR CODE	1 core Brown 2 cores Brown, Blue 3 cores Brown, Black, Grey 4 cores Brown, Black, Grey, Blue 5 cores Brown, Black, Grey, Blue, Green/Yellow 7 cores } 12 cores White insulation with core number indelibly marked at 19 cores regular maximum intervals of 50mm 27 cores } 37 cores 48 cores }
SHEATH	Black PVC
ARMOUR BEDDING	PVC
ARMOUR	Single Core - Aluminium Wire Multi Core - Galvanised Steel Wire
NOTES	The cable type shall be followed by a number that defines the number of cores within a given cable. e.g. J12 indicates a twelve core type J cable.

TYPE	G				
DESCRIPTION	Twisted Triads, Collectively Screened - Armoured One Triad, Ten Triad or Twenty Triad.				
MANUFACTURING SPECIFICATION	BS5308 Part 1 Type 2				
SERVICE	24V dc (Nominal) Digital, Pulse and Analogue Instrument Signals				
CONDUCTORS	Stranded Copper 0.5mm ² to 1.5 mm ²				
INSULATION	Polyethylene, with one core black, one core white and one core blue.				
MULTI-TRIAD IDENTIFICATION	All cores of each triad shall be indelibly numbered with the triad number at regular maximum intervals of 50mm				
LAYING UP	Three cores uniformly twisted together to form triads.				
COLLECTIVE SCREEN	Laminated tape with the metallic side down and in continuous contact with a tinned copper drain wire.				
ARMOUR BEDDING	Polyethylene				
ARMOUR	Galvanised Steel Wire				
SHEATH	PVC For intrinsically safe circuits the sheath colour shall be blue, for other circuits the sheath colour shall be black (See Notes).				
NOTES	<p>The cable type shall be followed by a number that defines the number of cores / pairs / triads within a given cable.</p> <p>In addition a suffix may be added where applicable as follows.</p> <table border="0"><thead><tr><th>Suffix</th><th>Description</th></tr></thead><tbody><tr><td>I</td><td>Intrinsically Safe Circuit</td></tr></tbody></table> <p>e.g. G10I indicates a ten triad type G cable with a blue sheath..</p>	Suffix	Description	I	Intrinsically Safe Circuit
Suffix	Description				
I	Intrinsically Safe Circuit				

Appendix III

Standard Specification for Instrument & Electrical installations

SI002001.INS Rev A



Section 6
ATEX Certificates



Section 7
Testing & Handover



Section 8
Manufacturers' Documentation

