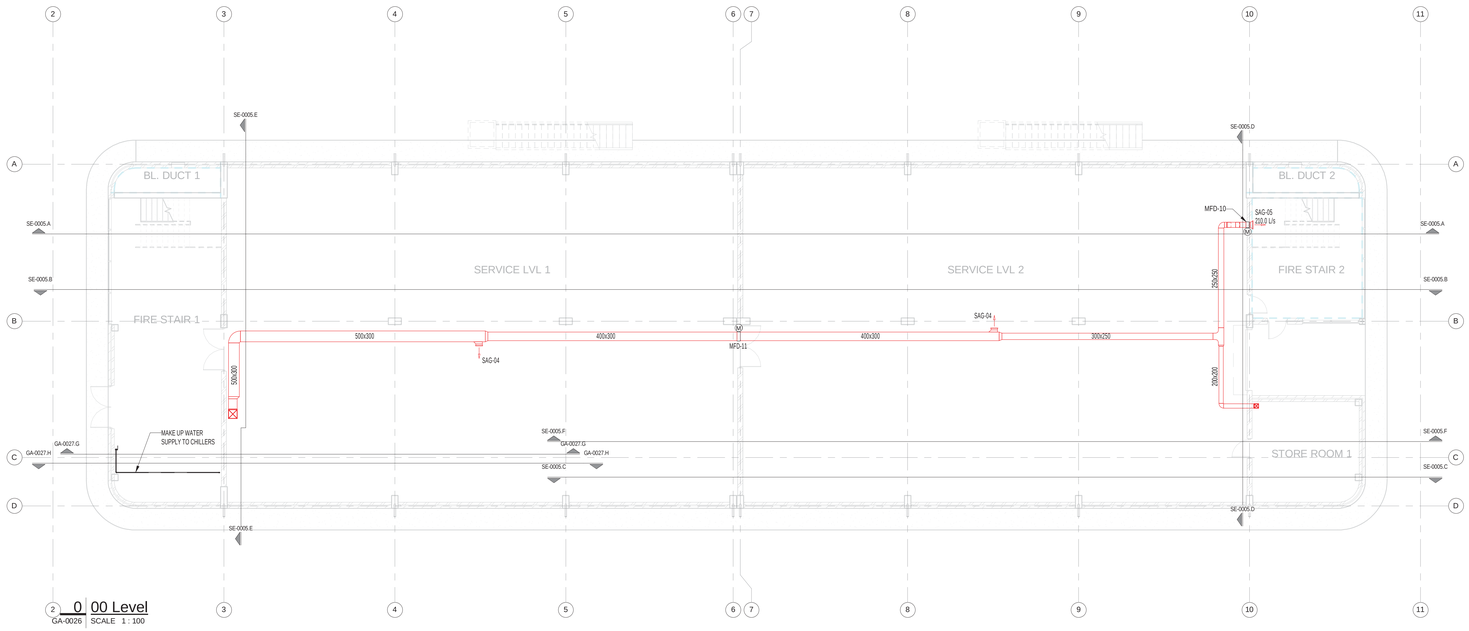
DESIGN DATA SCHEDULE

REF. NO.	DESCRIPTION	LOCATION / QUANTITY	AREA SERVED	POWER FROM		Electric Motors each		Mass each (kg)	Total for AHU or Fans (L/s)	TP (Pa) Ext. to AHU or Fans	COOLING						Return Air OBD (L/s)	Fresh Air OBD (L/s)	Floor Area (m2)
					Others	Load	Phase				Water Flow (L/s)	Cooling Coil (kW)	Air On °C		Air Off °C				
													DB	WB	DB	WB			
	System 1 - Electrical Equipment Cooling																		
AHU 01	EAST WING SUPPLY (Initial Installation)	1	RELAY ROOM	ACP-L1-01	SITE ELECTRICIAN	2.00 kW	3	250	1745	T.B.C.	1.0	21.7	30.2	19.3	13.7	13.2	505	1240	38
			METERING ROOM																38
			SCADA ROOM																38
			LV ROOM																38
AHU 02	WEST WING SUPPLY A (Initial Installation)	1	MV SWITCHGEAR ROOM - SOUTH	ACP-L1-01	SITE ELECTRICIAN	4.00 kW	3	600	3180	T.B.C.	3.0	68.2	30.2	19.3	13.7	13.2	2690	490	172
AHU 03	WEST WING SUPPLY B (Initial Installation)	1	MV SWITCHGEAR ROOM - NORTH	ACP-L1-01	SITE ELECTRICIAN	4.00 kW	3	600	3180	T.B.C.	3.0	68.2	30.5	19.7	13.6	13.1	2690	490	172
FCU 01	WEST WING SUPPLY C (Future Capacity Expansion)	T.B.C	MV SWITCHGEAR ROOM - SOUTH	ACP-L1-01	SITE ELECTRICIAN	1.00 kW	3	T.B.C.	890	N/A	0.8	17.5	30.2	19.3	13.7	13.2	890	0	172
FCU 02		T.B.C	MV SWITCHGEAR ROOM - NORTH	ACP-L1-01	SITE ELECTRICIAN	1.00 kW	3	T.B.C.	890	N/A	0.8	17.5	30.2	19.3	13.7	13.2	890	0	172
	System 2 - Fresh Air Supply																		
FAF 01	SPIN FILTER FAN	1	AHU 1	ACP-L1-01	SITE ELECTRICIAN	7.00 kW	3	1000	3985	T.B.C.	0	0.0	—	—	—	—	—	1240	N/A
			AHU 2														—	490	N/A
			AHU 3														—	490	N/A
			AC PLANTROOM														—	490	78
			INTERNAL CORRIDOR														—	440	155
			SOUTH STAIRWELL														—	130	70
			NORTH STAIRWELL														—	210	28
			LEVEL 00 SERVICE FLOOR														—	390	727
			NORTH EAST CORNER ROOM														—	105	27
	Chiller Units																		
ACC 01	AIR COOLED CHILLER	1	ALL AHU's	ACP-L2-01	SITE ELECTRICIAN	62.2 kW	3	2000	—	—	8.6	194	—	—	—	—			
ACC 02	AIR COOLED CHILLER	1	ALL AHU's	ACP-L2-01	SITE ELECTRICIAN	33.8 kW	3	1050	—	—	4.6	105	—	—	—	—			

DIFFUSER SCHEDULE

SUPPLY FROM	AREA SERVED	REFERENCE NO.	SUPPLY GRILLE QTY.	FLOW PER GRILLE (L/s)	GRILLE DIMENSIONS (L x W)	GRILLE - MAKE	GRILLE - MODEL		REFERENCE NO.	RETURN GRILLE QTY.	FLOW PER GRILLE (L/s)	GRILLE DIMENSIONS (L x W)	GRILLE - MAKE	GRILLE - MODEL
AHU 01	RELAY ROOM	SAG 03	2	140	250 x 150	Europair	DD + OBD		N/A	—	0	—	—	—
	METERING ROOM	SAG 03	2	140	250 x 150	Europair	DD + OBD		N/A	—	0	—	—	—
	SCADA ROOM	SAG 04	2	195	300 X 250	Europair	DD + OBD		RAG 01	1	110	250 x 200	Europair	RA
	LV ROOM	SAG 08	3	260	300 x 250	Europair	DD + OBD		RAG 02	2	395	300 x 250	Europair	RA
AHU 02	MV SWITCHGEAR ROOM - SOUTH	SAG 09	6	530	525 x 300	Europair	DD + OBD		RAG 03	5	540	400 x 350	Europair	RA
AHU 03	MV SWITCHGEAR ROOM - NORTH	SAG 09	6	530	525 x 300	Europair	DD + OBD		RAG 03	5	540	400 x 350	Europair	RA
FAF 01	AHU 1	OBD	1	1240	—	N/A	N/A							
	AHU 2	OBD	1	490	—	N/A	N/A							
	AHU 3	OBD	1	490	—	N/A	N/A							
	INTERNAL CORRIDOR	SAG 07	2	245	375 X 200	Europair	DD + OBD							
	LEVEL 00 - A/C ROOM 1	SAG 06	2	220	375 X 200	Europair	DD + OBD							
	SOUTH STAIRWELL	SAG 02	1	130	250 X 150	Europair	DD + OBD							
	NORTH STAIRWELL	SAG 05	1	210	300 x 250	Europair	DD + OBD							
	LEVEL 00 SERVICE FLOOR	SAG 04	2	195	300 x 250	Europair	DD + OBD							
	NORTH-EAST CORNER ROOM	SAG 01	1	105	300 x 300	Europair	FG 15° + OBD							



WEATHER LOUVER SCHEDULE

REF. NO.	SIZE	QTY
WL 01	1500x1500	1

SMOKE VENT SCHEDULE

REF. NO.	SIZE	QTY
SMOKE VENTILATOR	3600x1000	2

MOTOTRIZED FIRE DAMPER SCHEDULE

REF. NO.	SIZE	QTY
MFD-01	300x300-300x300	1
MFD-02	350x350-350x350	3
MFD-03	400x400-400x400	2
MFD-04	500x450-500x450	1
MFD-05	500x500-500x500	1
MFD-06	550x550-550x550	1
MFD-07	650x600-650x600	4
MFD-08	700x650-700x650	4
MFD-09	200x200-200x200	3
MFD-10	250x250-250x250	1
MFD-11	400x300-400x300	1

Grand total: 22

HVAC DUCT LEGEND

- FRESH AIR
- RETURN AIR
- SUPPLY AIR
- MECHANICAL EQUIPMENT/ AIR TERMINALS/ DUCT ACCESSORIES

LEGEND

FAF	FRESH AIR SUPPLY FAN
EAF	EXHAUST AIR FAN
∅	1-PHASE ISOLATOR LOCAL WEATHER PROOF ISOLATOR BY SITE ELECTRICIAN. HVAC CONTRACTOR TO PROVIDE FAN STARTER AND OVERLOAD PROTECTION FOR FAN.
∅	3-PHASE ISOLATOR: SITE ELECTRICIAN TO CONNECT ONTO 3-PHASE ISOLATOR IN ACP
	Ø50 TRAPPED DRAIN POINT BY PLUMBER
SAT	SOUND ATTENUATOR
	DOOR UNDERCUT 25mm BY OTHERS
M	MOTORIZED FIRE DAMPER WITH A 16 GAUGE GALVANIZED SLEEVE TO BE BUILT IN BY BUILDER
	FIRE DAMPER
T	WIRED REMOTE TEMPERATURE CONTROLLER
ACU	AIR CONDITIONING UNIT. INCLUDING LOCAL ISOLATOR BY HVAC CONTRACTOR
	BUTTERFLY DAMPER
	NON-RETURN DAMPER
	ON/OFF CANOPY SWITCH
	ELECTRICAL DISTRIBUTION PANEL

MASTER
10 FEB 2017
AECOM
TRANSNET

DRAWING NO.	REFERENCE
1924701-2-510-M-GA-0027-01	HVAC GENERAL ARRANGEMENT - LEVEL 01
1924701-2-510-M-GA-0028-01	HVAC GENERAL ARRANGEMENT - LEVEL 02
1924701-2-510-M-SD-0005-01	CHILLED WATER SCHEMATIC
1924701-2-510-M-SE-0004-01	HVAC SECTION LAYOUT

REFERENCE DRAWINGS

NOTES

1. **DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED**
2. **THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.**

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TYGER WATERFRONT
CARL CRONJE DRIVE

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FAX: +27 (0)21 950 7502
REG. No. 1966/006628/07

REVISIONS

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	K.C.	J.J.	A.D.	2017-01-27

CONTRACTOR/CONSULTANT			
TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS					
TITLE	NAME	SIGN	DATE		
DRAWN	K.C.		27	01	17
CHECKED	J.J.		27	01	17
DESIGNED	J.J.		27	01	17
CHECKED	A.D.		27	01	17

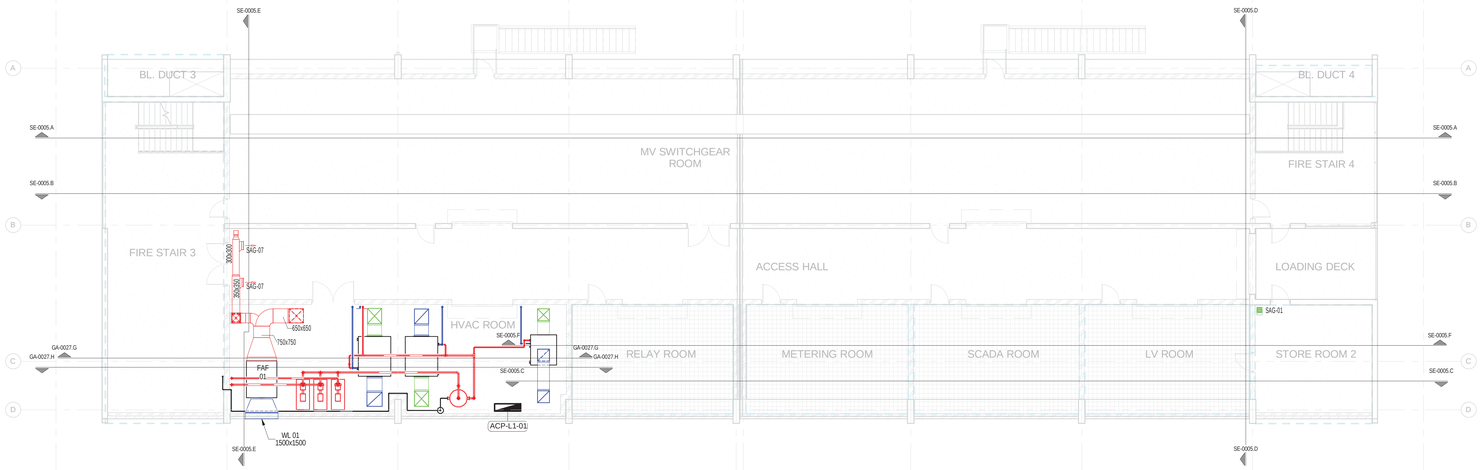
PR.ENG./PR.TECH./PR.ARCH			
NAME	A.N. DALLY		DATE
SIGNATURE			27 01 17
REG. NUMBER	9170004		
SCALE:	1:100		A0

Transnet Capital Projects
TRANSNET LTD. (TRADING AS TRANSNET CAPITAL PROJECTS) REG. NO. 1990/000906/06
TABLE BAY BUILDING, TYGERBERG PARK,
163 LUYS KRIGE DRIVE, PLATTEKLOOF,
8001
TEL: 021 940 1999
FAX: 086 677 2455

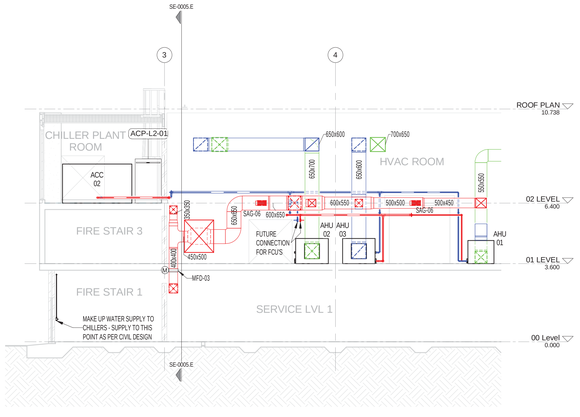
PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
MAIN INTAKE SUBSTATION
HVAC GENERAL ARRANGEMENT - LEVEL 00

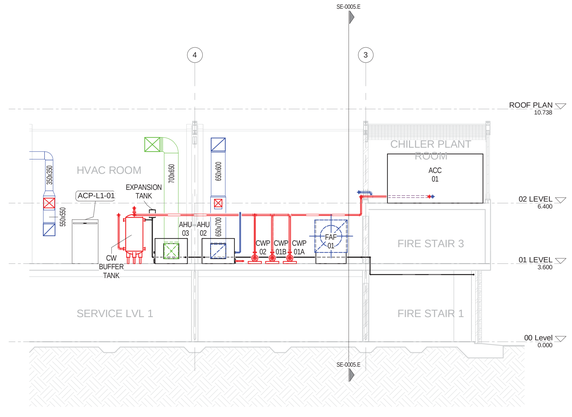
PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	510	M	GA	0026	01	00	AE



1 | 01 LEVEL
GA-0027 | SCALE 1 : 100



G | Section G-G
GA-0027 | SCALE 1 : 100



H | Section H-H
GA-0027 | SCALE 1 : 100

HVAC DUCT LEGEND

- FRESH AIR
- RETURN AIR
- SUPPLY AIR
- MECHANICAL EQUIPMENT/ AIR TERMINALS/ DUCT ACCESSORIES

LEGEND

FAF	FRESH AIR SUPPLY FAN
EAF	EXHAUST AIR FAN
∅	1-PHASE ISOLATOR LOCAL WEATHER PROOF ISOLATOR BY SITE ELECTRICIAN. HVAC CONTRACTOR TO PROVIDE FAN STARTER AND OVERLOAD PROTECTION FOR FAN.
∅	3-PHASE ISOLATOR: SITE ELECTRICIAN TO CONNECT ONTO 3-PHASE ISOLATOR IN ACP
	Ø50 TRAPPED DRAIN POINT BY PLUMBER
SAT	SOUND ATTENUATOR
	DOOR UNDERCUT 25mm BY OTHERS
M	MOTORIZED FIRE DAMPER WITH A 16 GAUGE GALVANIZED SLEEVE TO BE BUILT IN BY BUILDER
	FIRE DAMPER
T	WIRED REMOTE TEMPERATURE CONTROLLER
ACU	AIR CONDITIONING UNIT. INCLUDING LOCAL ISOLATOR BY HVAC CONTRACTOR
	BUTTERFLY DAMPER
	NON-RETURN DAMPER
	ON/OFF CANOPY SWITCH
	ELECTRICAL DISTRIBUTION PANEL

MASTER
10 FEB 2017
AECOM
TRANSNET

REFERENCE DRAWINGS

DRAWING NO.	REFERENCE
1924701-2-510-M-GA-0026-01	HVAC GENERAL ARRANGEMENT - LEVEL 00
1924701-2-510-M-SD-0005-01	CHILLED WATER SCHEMATIC
1924701-2-510-M-SE-0004-01	HVAC SECTION LAYOUT

NOTES

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REVISIONS

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	K.C.	J.J	A.D	2017-01-27

CONTRACTOR/CONSULTANT			
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TITLE	NAME	SIGN	DATE

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PR.ENG./PR.TECH./PR.ARCH		
NAME	A.N. DALLY	DATE
SIGNATURE		27 01 17
REG. NUMBER	9170004	
SCALE:	1:100	A0

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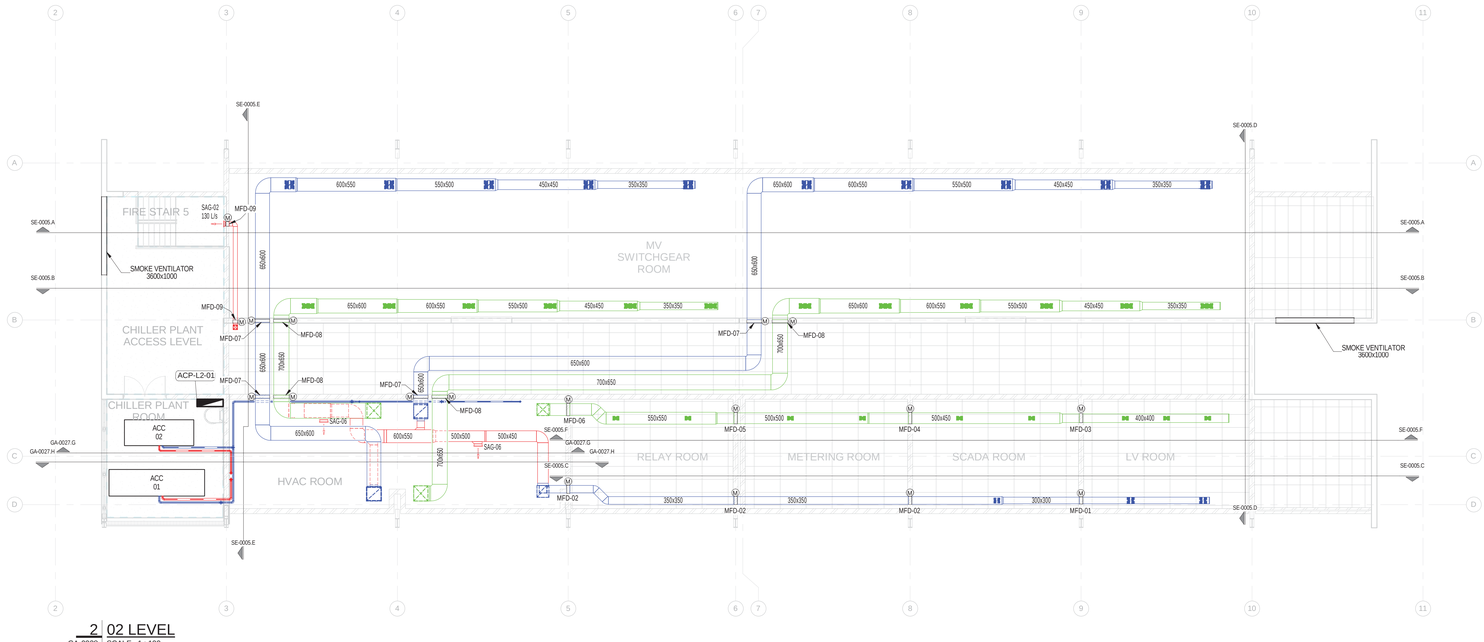
PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
MAIN INTAKE SUBSTATION
HVAC GENERAL ARRANGEMENT - LEVEL 01

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	510	M	GA	0027	01	00	AE



2 02 LEVEL
GA-0028 SCALE 1 : 100

HVAC DUCT LEGEND

- FRESH AIR
- RETURN AIR
- SUPPLY AIR
- MECHANICAL EQUIPMENT/ AIR TERMINALS/ DUCT ACCESSORIES

LEGEND	
FAF	FRESH AIR SUPPLY FAN
EAF	EXHAUST AIR FAN
∅	1-PHASE ISOLATOR LOCAL WEATHER PROOF ISOLATOR BY SITE ELECTRICIAN. HVAC CONTRACTOR TO PROVIDE FAN STARTER AND OVERLOAD PROTECTION FOR FAN
∅	3-PHASE ISOLATOR: SITE ELECTRICIAN TO CONNECT ONTO 3-PHASE ISOLATOR IN ACP
	Ø50 TRAPPED DRAIN POINT BY PLUMBER
SAT	SOUND ATTENUATOR
	DOOR UNDERCUT 25mm BY OTHERS
M	MOTORIZED FIRE DAMPER WITH A 16 GAUGE GALVANIZED SLEEVE TO BE BUILT IN BY BUILDER
	FIRE DAMPER
T	WIRED REMOTE TEMPERATURE CONTROLLER
ACU	AIR CONDITIONING UNIT: INCLUDING LOCAL ISOLATOR BY HVAC CONTRACTOR
	BUTTERFLY DAMPER
	NON-RETURN DAMPER
	ON/OFF CANOPY SWITCH
	ELECTRICAL DISTRIBUTION PANEL

MASTER
10 FEB 2017
AECOM TRANSNET

DRAWING NO.	REFERENCE
1924701-2-510-M-GA-0026-01	HVAC GENERAL ARRANGEMENT - LEVEL 00
1924701-2-510-M-SD-0005-01	CHILLED WATER SCHEMATIC
1924701-2-510-M-SE-0004-01	HVAC SECTION LAYOUT

REFERENCE DRAWINGS

NOTES

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NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	K.C	J.J	A.D	2017-01-27

REVISIONS

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TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE
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DESIGNED	J.J.		27 01 17
CHECKED	A.D.		27 01 17

PR.ENG./PR.TECH./PR.ARCH		
NAME	A.N. DALLY	DATE
SIGNATURE		27 01 17
REG. NUMBER	9170004	

SCALE: 1:100 A0

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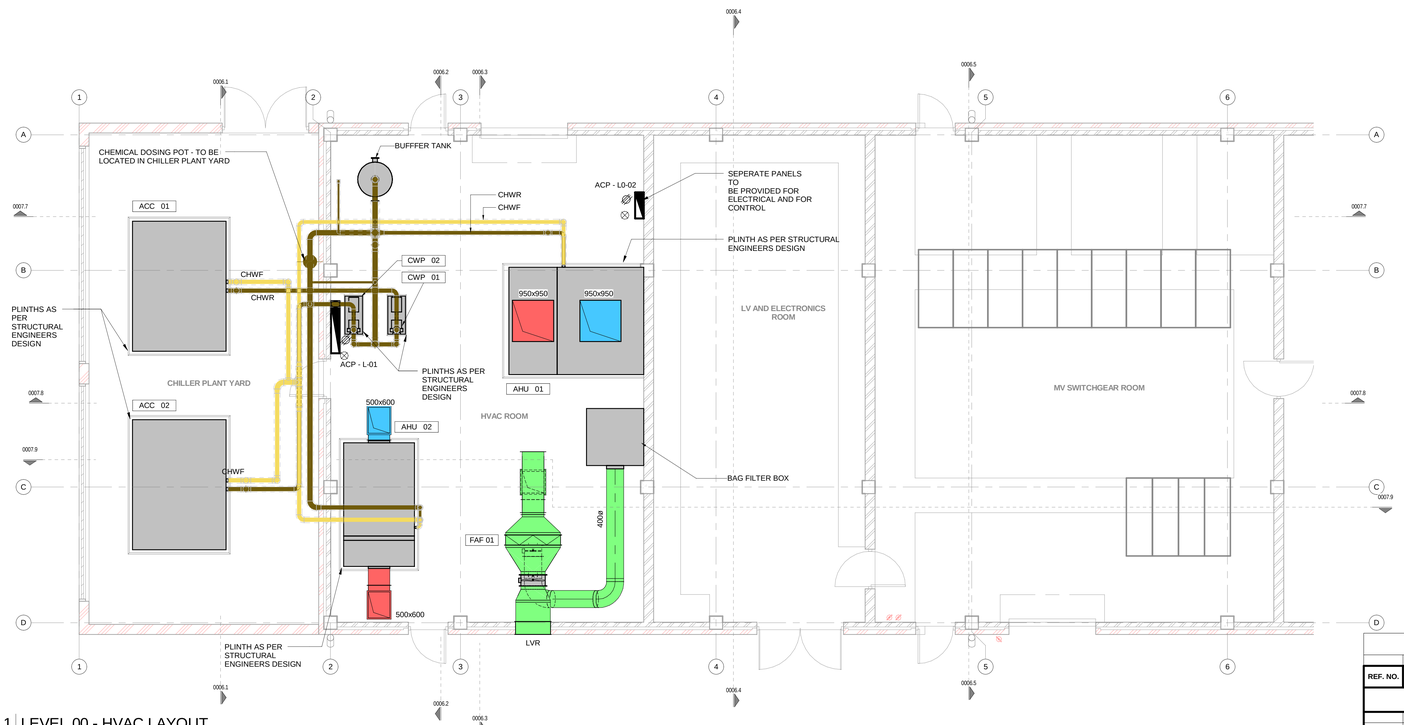
PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
MAIN INTAKE SUBSTATION
HVAC GENERAL ARRANGEMENT - LEVEL 02

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	510	M	GA	0028	01	00	AE



1 LEVEL 00 - HVAC LAYOUT

0029 SCALE 1 : 50

MECH - SA GRILLE SCHEDULE

Supply From	Area Served	Reference Number	Total Airflow (L/s)	Grille Qty.	Flow (L/s) used for selection	Grille Dimensions (L x W)	Grille - Make	Grille - Model
AHU 01	VSD AND TRASFORMER ROOM	SAG 01	8400	10	840	1125 x 325	Trox	Type TR
AHU 02	MV SWITCHGEAR ROOM	SAG 02	1050	3	350	480 x 250	Europair	DD+OBD
	LV AND ELECTRONICS ROOM	SAG 02	650	2	325	480 x 250	Europair	DD+OBD
FAF 01	AHU 1	—	560	1	560	—	—	—
	AHU 2	—	870	1	870	—	—	—
	HVAC PLANT ROOM	SAG 03	380	1	380	480 x 250	Europair	DD+OBD

MECH - RA GRILLE SCHEDULE

REFERENCE NUMBER	RETURN AIRFLOW (L/s)	GRILLE QTY	DIMENSIONS		SELECTION AIRFLOW	MANUFACTURER	MODEL
			HEIGHT	WIDTH			
RAG 01	7850 L/s	10	300	850	785 L/s	TROX	TYPE TR
RAG 02	490 L/s	2	250	450	245 L/s	EUROPAIR	RA+OBD
RAG 02	340 L/s	1	250	450	340 L/s	EUROPAIR	RA+OBD

MECH - FIRE DAMPER SCHEDULE

COMPONENT MARK	TYPE	DIMENSIONS		TOTAL
		HEIGHT	WIDTH	
FD 01	FIRE DAMPER - MOTORIZED - RECTANGULAR	400	450	1
FD 02	FIRE DAMPER - MOTORIZED - RECTANGULAR	500	600	1
FD 03	FIRE DAMPER - MOTORIZED - RECTANGULAR	600	1600	3
FD 04	FIRE DAMPER - MOTORIZED - RECTANGULAR	600	1500	2
FD 07	FIRE DAMPER - MOTORIZED - RECTANGULAR	600	850	2
FD-05	FIRE DAMPER - MOTORIZED - RECTANGULAR	300	400	1
FD-06	FIRE DAMPER - MOTORIZED - RECTANGULAR	450	450	1

MECH - BALANCING DAMPER SCHEDULE

COMPONENT MARK	TYPE	DIMENSIONS		TOTAL
		HEIGHT	WIDTH	
BDA 01	BALANCING DAMPER	300	850	10
BDA 02	BALANCING DAMPER	325	1225	10
BDA 03	BALANCING DAMPER	350	400	1
BDA 04	BALANCING DAMPER	300	350	1

MECH - SOUND ATTENUATOR SCHEDULE

REFERENCE NUMBER	HEIGHT	WIDTH	TOTAL
ATT 01	400	450	1
ATT 02	600	1500	1
ATT 03	600	1600	1
ATT 04	500	600	1

LEGEND

FAF	FRESH AIR SUPPLY FAN
EAF	EXHAUST AIR FAN
∅	230V / 1 Phase / 50 Hz POWER SUPPLY AND ISOLATOR BY ELECTRICIAN, TERMINATION AT EQUIPMENT BY HVAC CONTRACTOR. MOTOR STARTERS AND OVERLOAD PROTECTION TO BE BY HVAC CONTRACTOR, WHERE APPLICABLE
∅	400V / 3 Phase / 50 Hz POWER SUPPLY AND ISOLATOR BY ELECTRICAL CONTRACTOR, TERMINATION AT EQUIPMENT BY HVAC CONTRACTOR. MOTOR STARTERS AND OVERLOAD PROTECTION TO BE BY HVAC CONTRACTOR, WHERE APPLICABLE
	Ø50 TRAPPED DRAIN POINT BY PLUMBER
SAT	SOUND ATTENUATOR
	DOOR UNDERCUT 25mm BY OTHERS
M	MOTORIZED FIRE DAMPER WITH A 16 GAUGE GALVANIZED SLEEVE TO BE BUILT IN BY BUILDER
	FIRE DAMPER
T	WIRED REMOTE TEMPERATURE CONTROLLER
ACU	AIR CONDITIONING UNIT: INCLUDING LOCAL ISOLATOR BY HVAC CONTRACTOR
	BUTTERFLY DAMPER
	NON-RETURN DAMPER
C	ON/OFF CANOPY SWITCH
	ELECTRICAL DISTRIBUTION PANEL
⊗	FIRE INTERLOCK; RELAY AND WIRING UP TO INDICATED POINT BY FIRE DETECTION CONTRACTOR, TERMINATION AT EQUIPMENT BY HVAC CONTRACTOR

HVAC PIPE LEGEND

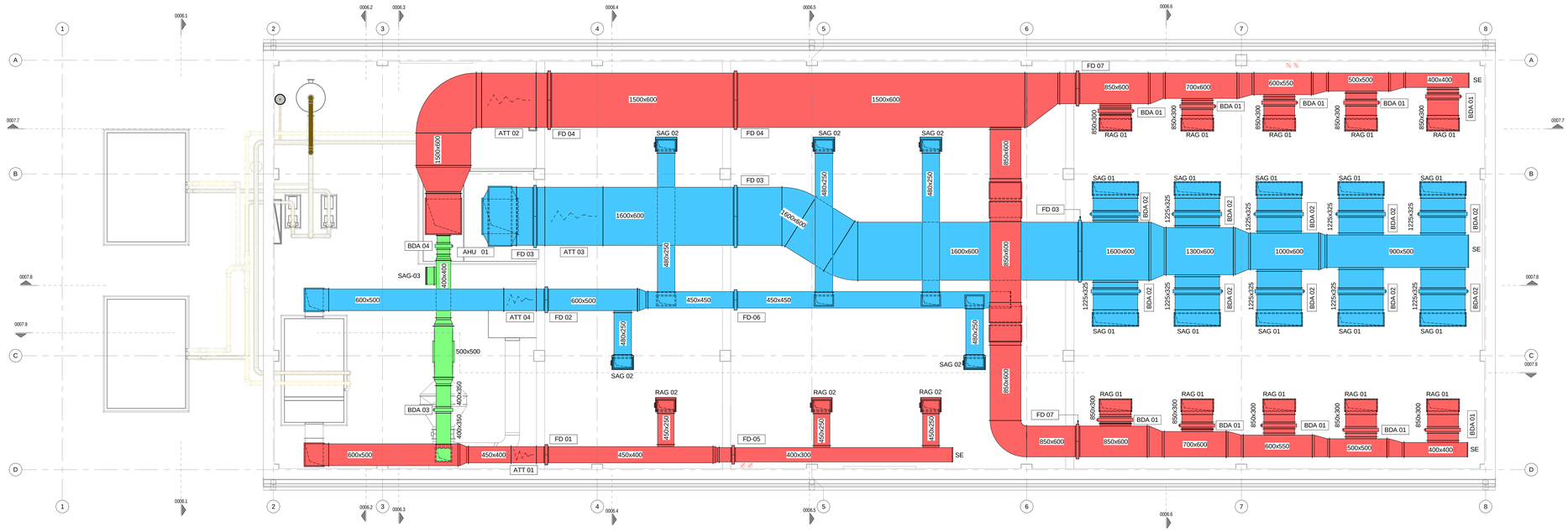
- CHILLED WATER
- CHILLED WATER

HVAC LEGEND

- EXHAUST
- FRESH AIR/NATURAL
- RETURN
- SUPPLY
- FOUL
- MECHANICAL EQUIP/ AIR TERMINALS/ DUCT ACCESSORIES

DESIGN DATA SCHEDULE

REF. NO.	DESCRIPTION	QTY.	AREA SERVED	EQUIPMENT POWER FROM		Electric Motors / Rated Electric Duty (Total)		Mass each (kg)	Total Airflow (L/s)	Total Pressure (Pa) Ext. to AHU	COOLING						HEATING	MIXING BOX		Floor Area (m2)
				Others							Total Water Flow (L/s)	Total Cooling (kW)	Air On °C		Air Off °C		Heating (kW)	Return Air (L/s)	Fresh Air (L/s)	
						Load	Phase						DB	WB	DB	WB				
Airside Units																				
AHU 01	VERTICAL DISCHARGE AIR HANDLING UNIT	1	VSD AND TRASFORMER ROOM	ACP-L0-02	SITE ELECTRICIAN	7.50 kW	3	t.b.c.	8400	425	7.5	170.9	29.9	19.2	13.7	13.2	0.0	7840	560	126
AHU 02	HORIZONTAL DISCHARGE AIR HANDLING UNIT	1	MV SWITCHGEAR ROOM	ACP-L0-02	SITE ELECTRICIAN	1.50 kW	3	t.b.c.	1700	425	1.8	40.8	29.4	20.1	13.6	13.1	0.0	490	560	103
			LV AND ELECTRONICS ROOM															340	310	55
FAF 01	SPIN FILTER FAN	1	AHU 1	ACP-L0-02	SITE ELECTRICIAN	2.20 kW	3	t.b.c.	1810	190	0	0.0	—	—	—	—	—	0	560	N/A
			AHU 2										—	—	—	—	—	0	870	N/A
			HVAC PLANT ROOM										—	—	—	—	—	0	380	82
Chiller Units																				
ACC 01	AIR COOLED CHILLER	1	ALL AHU's	ACP-L0-01	SITE ELECTRICIAN	47.0 kW	3	t.b.c.	—	—	6.2	142	—	—	—	—	0.0			
ACC 02	AIR COOLED CHILLER	1	ALL AHU's	ACP-L0-01	SITE ELECTRICIAN	47.0 kW	3	t.b.c.	—	—	6.2	142	—	—	—	—	0.0			



2 TO BEAM - HVAC LAYOUT

0029 SCALE 1 : 50

MASTER
30 MAY 2018
AECOM TRANSNET

1924701-2-510-M-ST-0005	SUBSTATION M - STANDARD PIPING DETAILS
1924701-2-510-M-ST-0004	SUBSTATION M - STANDARD DUCTING DETAILS
1924701-2-510-M-SE-0007	SUBSTATION M - HVAC SECTION LAYOUT (SHEET 2)
1924701-2-510-M-SE-0006	SUBSTATION M - HVAC SECTION LAYOUT (SHEET 1)
1924701-2-510-M-SD-0005	SUBSTATION M - CHILLED WATER SCHEMATIC
DRAWING	REFERENC

REFERENCE DRAWINGS

GENERAL NOTES

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NO	DESCRIPTIO	BY	CHK	APPD	DATE
00	ISSUED FOR CONSTRUCTION	AJ	JJ	AD	30-05-2018

REVISIONS

CONTRACTOR/CONSULTANT			
TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE
DRAWN	A JULIUS		30 05 18
CHECKED	J JOOSTE		30 05 18
DESIGNED	J JOOSTE		30 05 18
CHECKED	A DALLY		30 05 18

PR.ENG./PR.TECH./PR.ARCH		
NAME	A.N DALLY	DATE
SIGNATURE		30 05 18
REG. NUMBER	9170004	
SCALE:	AS SHOWN	

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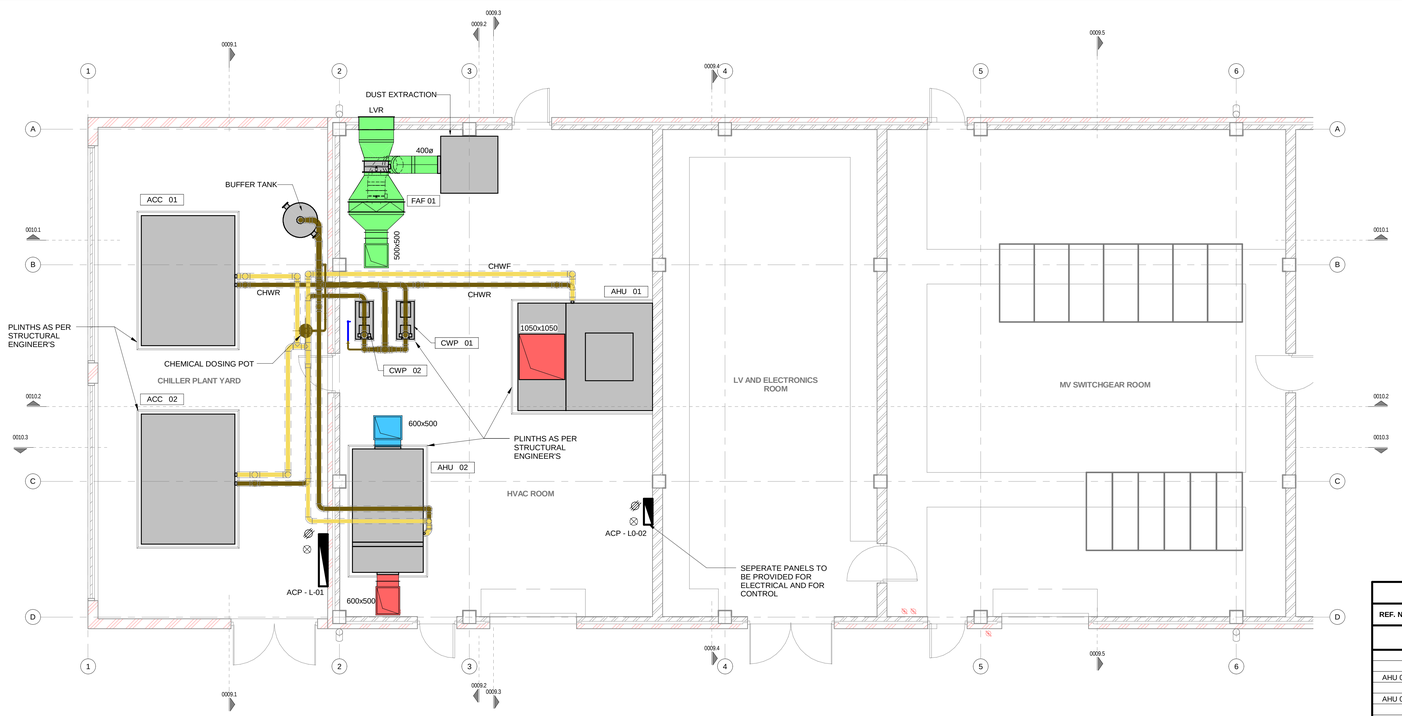
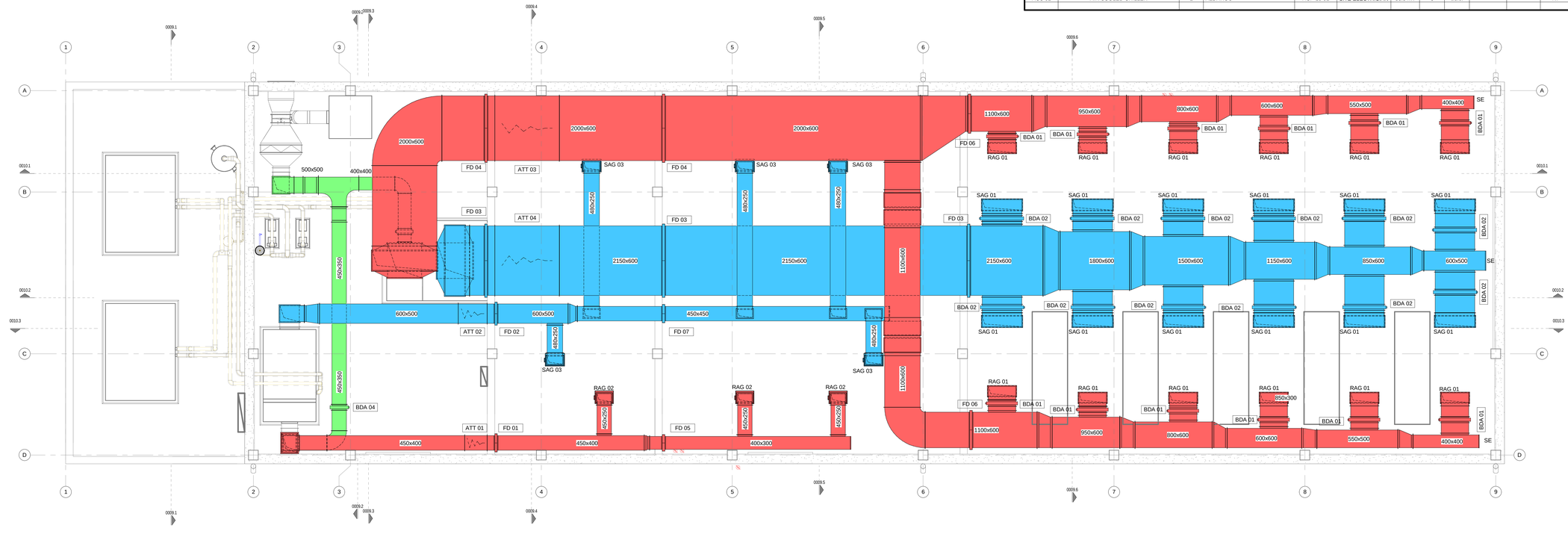
PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION M
HVAC GENERAL ARRANGEMENT LAYOUT

PROJECT NUMBER	OO	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
A0 1 9 2 4 7 0 1	2	5 1 0	M	G A	0 0 2 9	0 1	00	AE



1 | LEVEL 00 - HVAC LAYOUT
0031 | SCALE 1 : 50



2 | TOC BEAM - HVAC LAYOUT
0031 | SCALE 1 : 50

MECH - SA GRILLE SCHEDULE

Supply From	Area Served	Reference Number	Total Airflow (L/s)	Grille Qty.	Flow (L/s) used for selection	Grille Dimensions (L x W)	Grille - Make	Grille - Model
AHU 01	VSD AND TRANSFORMER ROOM	SAG 01	11000	12	915	1125 x 325	Trox	Type TR
AHU 02	MV SWITCHGEAR ROOM	SAG 02	1050	3	350	480 x 250	Europair	DD+OBD
	LV AND ELECTRONICS ROOM	SAG 03	650	2	325	480 x 250	Europair	DD+OBD
FAF 01	AHU 1	—	590	1	590	—	—	—
	AHU 2	—	870	1	870	—	—	—
	HVAC PLANTROOM	SAG 04	380	1	380	250 x 200	Europair	DD+OBD

MECH - RA GRILLE SCHEDULE

REFERENCE NUMBER	RETURN AIRFLOW (L/s)	GRILLE QTY	DIMENSIONS		SELECTION AIRFLOW	MANUFACTURER	MODEL
			HEIGHT	WIDTH			
RAG 01	10380 L/s	12	300	850	865 L/s	TROX	TYPE TR
RAG 02	490 L/s	2	250	450	245 L/s	EUROPAIR	RA+OBD
FD 03	340 L/s	1	250	450	340 L/s	EUROPAIR	RA+OBD

MECH - FIRE DAMPER SCHEDULE

COMPONENT MARK	TYPE	DIMENSIONS		TOTAL
		HEIGHT	WIDTH	
FD 01	FIRE DAMPER - MOTORIZED - RECTANGULAR	400	450	1
FD 02	FIRE DAMPER - MOTORIZED - RECTANGULAR	500	600	1
FD 03	FIRE DAMPER - MOTORIZED - RECTANGULAR	600	2150	3
FD 04	FIRE DAMPER - MOTORIZED - RECTANGULAR	600	2000	2
FD 05	FIRE DAMPER - MOTORIZED - RECTANGULAR	300	400	1
FD 06	FIRE DAMPER - MOTORIZED - RECTANGULAR	600	1100	2
FD 07	FIRE DAMPER - MOTORIZED - RECTANGULAR	450	450	1

MECH - BALANCING DAMPER SCHEDULE

COMPONENT MARK	TYPE	DIMENSIONS		TOTAL
		HEIGHT	WIDTH	
BDA 01	BALANCING DAMPER	300	850	12
BDA 02	BALANCING DAMPER	325	1225	12
BDA 03	BALANCING DAMPER	400	400	1
BDA 04	BALANCING DAMPER	350	450	1

MECH - SOUND ATTENUATOR SCHEDULE

REFERENCE NUMBER	HEIGHT	WIDTH	TOTAL
ATT 01	400	450	1
ATT 02	500	600	1
ATT 03	600	2000	1
ATT 04	600	2150	1

LEGEND

FAF	FRESH AIR SUPPLY FAN
EAF	EXHAUST AIR FAN
∅	230V / 1 Phase / 50 Hz POWER SUPPLY AND ISOLATOR BY ELECTRICIAN. TERMINATION AT EQUIPMENT BY HVAC CONTRACTOR. MOTOR STARTERS AND OVERLOAD PROTECTION TO BE BY HVAC CONTRACTOR, WHERE APPLICABLE
∅	400V / 3 Phase / 50 Hz POWER SUPPLY AND ISOLATOR BY ELECTRICAL CONTRACTOR. TERMINATION AT EQUIPMENT BY HVAC CONTRACTOR. MOTOR STARTERS AND OVERLOAD PROTECTION TO BE BY HVAC CONTRACTOR, WHERE APPLICABLE
	Ø50 TRAPPED DRAIN POINT BY PLUMBER
SAT	SOUND ATTENUATOR
	DOOR UNDERCUT 25mm BY OTHERS
M	MOTORIZED FIRE DAMPER WITH A 16 GAUGE GALVANIZED SLEEVE TO BE BUILT IN BY BUILDER
	FIRE DAMPER
T	WIRED REMOTE TEMPERATURE CONTROLLER
ACU	AIR CONDITIONING UNIT: INCLUDING LOCAL ISOLATOR BY HVAC CONTRACTOR
	BUTTERFLY DAMPER
	NON-RETURN DAMPER
	ON/OFF CANOPY SWITCH
	ELECTRICAL DISTRIBUTION PANEL
⊗	FIRE INTERLOCK: RELAY AND WIRING UP TO INDICATED POINT BY FIRE DETECTION CONTRACTOR. TERMINATION AT EQUIPMENT BY HVAC CONTRACTOR

HVAC PIPE LEGEND

- CHILLED WATER
- CHILLED WATER

HVAC LEGEND

- EXHAUST
- FRESH AIR/NATURAL
- RETURN
- SUPPLY
- FOUL
- MECHANICAL EQUIP/ AIR TERMINALS/ DUCT ACCESSORIES

DESIGN DATA SCHEDULE

REF. NO.	DESCRIPTION	QTY.	AREA SERVED	EQUIPMENT POWER FROM		Electric Motors / Rated Electric Duty (Total)		Mass each (kg)	Total Airflow (L/s)	Total Pressure (Pa) Ext. to AHU	COOLING						HEATING	MIXING BOX		Floor Area (m2)
					Others	Load	Phase				Total Water Flow (L/s)	Total Cooling (kW)	Air On °C		Air Off °C		Heating (kW)	Return Air (L/s)	Fresh Air (L/s)	
													DB	WB	DB	WB				
	Airside Units																			
AHU 01	VERTICAL DISCHARGE AIR HANDLING UNIT	1	VSD AND TRANSFORMER ROOM	ACP-L0-02	SITE ELECTRICIAN	9.80 kW	3	t.b.c.	11000	415	9.7	221.2	29.9	19.1	13.7	13.2	0.0	10410	590	192
AHU 02	HORIZONTAL DISCARGE AIR HANDLINDG UNIT	1	MV SWITCHGEAR ROOM	ACP-L0-02	SITE ELECTRICIAN	1.50 kW	3	t.b.c.	1700	415	1.9	41.7	29.4	20.1	13.6	13.1	0.0	490	560	103
			LV AND ELECTRONICS ROOM															340	310	55
FAF 01	SPIN FILTER FAN	1	AHU 1	ACP-L0-02	SITE ELECTRICIAN	2.3 kW	3	t.b.c.	1840	315	0	0.0	—	—	—	—	—	0	590	N/A
			AHU 2										—	—	—	—	—	0	870	N/A
			HVAC PLANTROOM										—	—	—	—	—	0	380	82
	Chiller Units																			
ACC 01	AIR COOLED CHILLER	1	ALL AHU's	ACP-L0-01	SITE ELECTRICIAN	58.5 kW	3	t.b.c.	—	—	7.7	175.3	—	—	—	—	0.0			
ACC 02	AIR COOLED CHILLER	1	ALL AHU's	ACP-L0-01	SITE ELECTRICIAN	58.5 kW	3	t.b.c.	—	—	7.7	175.3	—	—	—	—	0.0			

MASTER
3 0 MAY 2018
AECOM TRANSNET

DRAWING	REFERENC
1924701-2-510-M-ST-0007	SUBSTATION N - STANDARD PIPING DETAILS
1924701-2-510-M-ST-0006	SUBSTATION N - STANDARD DUCTING DETAILS
1924701-2-510-M-SE-0010	SUBSTATION N - HVAC SECTION LAYOUT (SHEET 2)
1924701-2-510-M-SE-0009	SUBSTATION N - HVAC SECTION LAYOUT (SHEET 1)
1924701-2-510-M-SD-0007	SUBSTATION N - CHILLED WATER SCHEMATIC

REFERENCE DRAWINGS

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REVISIONS

NO	DESCRIPTIO	BY	CHK	APPD	DATE
00	ISSUED FOR CONSTRUCTION	AJ	JJ	AD	30-05-2018

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CONTRACTOR/CONSULTANT			
TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE
DRAWN	A JULIUS		30 05 18
CHECKED	J JOOSTE		30 05 18
DESIGNED	J JOOSTE		30 05 18
CHECKED	A DALLY		30 05 18

PR.ENG./PR.TECH./PR.ARCH		
NAME	A N DALLY	DATE
SIGNATURE		30 05 18
REG. NUMBER	9170004	
SCALE:	AS SHOWN	A0

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FAX: 086 677 2455

PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION N
HVAC GENERAL ARRANGEMENT LAYOUT

PROJECT NUMBER	OO	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
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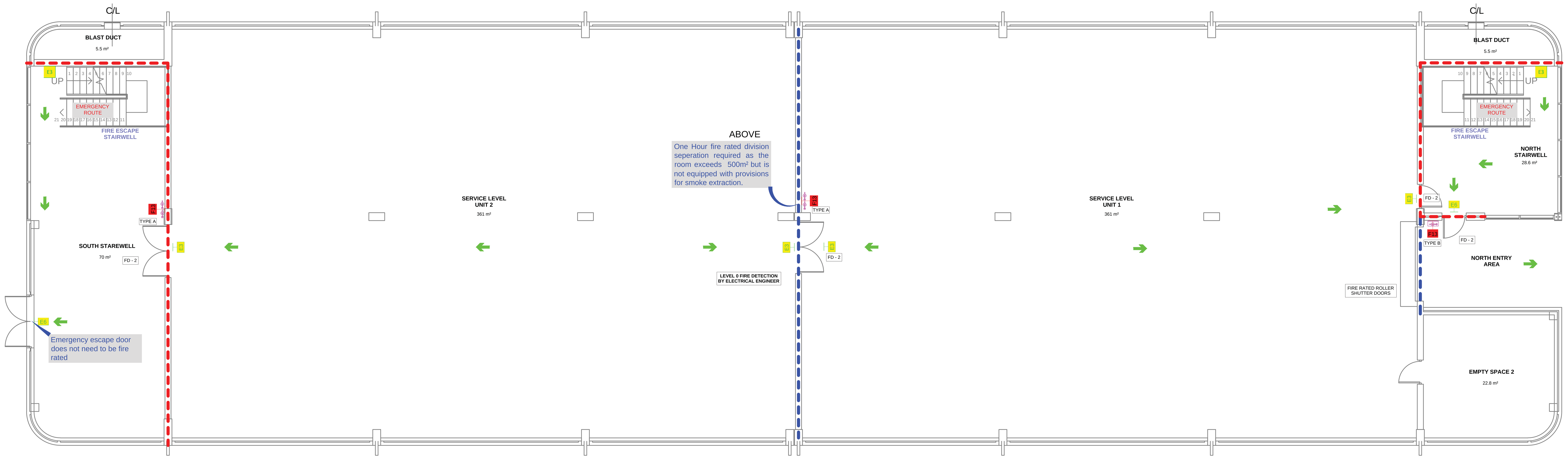
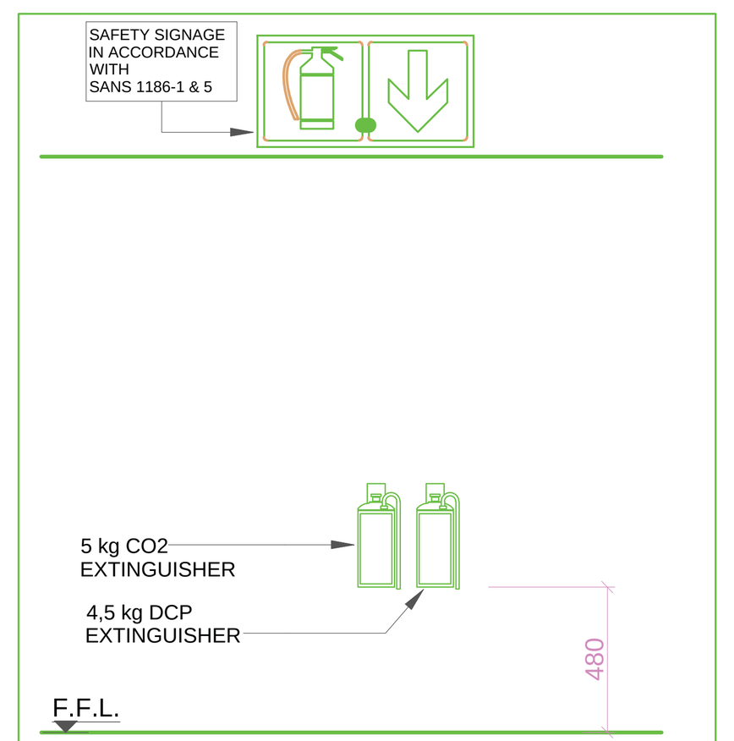
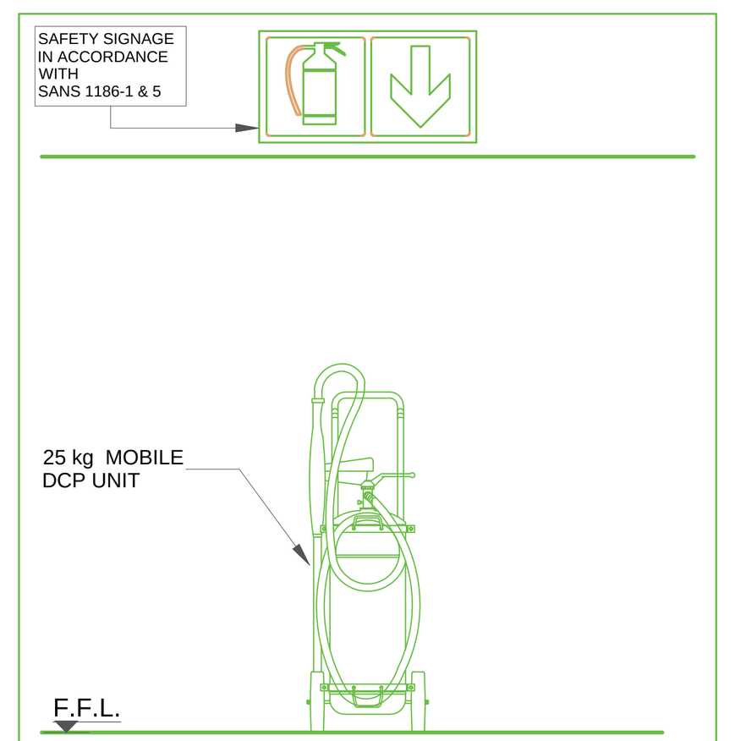

C/L
BLAST DUCT
5.5 m²
E3
UP
EMERGENCY ROUTE
FIRE ESCAPE STAIRWELL
F13
TYPE A
SOUTH STAREWELL
70 m²
FD - 2
E3
E6
Emergency escape door does not need to be fire rated
SERVICE LEVEL UNIT 2
361 m²
ABOVE
One Hour fire rated division seperation required as the room exceeds 500m² but is not equipped with provisions for smoke extraction.
F13
TYPE A
E3
E3
FD - 2
LEVEL 0 FIRE DETECTION BY ELECTRICAL ENGINEER
SERVICE LEVEL UNIT 1
361 m²
C/L
BLAST DUCT
5.5 m²
E3
UP
EMERGENCY ROUTE
FIRE ESCAPE STAIRWELL
NORTH STAIRWELL
28.6 m²
E3
FD - 2
E6
F13
TYPE B
FD - 2
NORTH ENTRY AREA
FIRE RATED ROLLER SHUTTER DOORS
EMPTY SPACE 2
22.8 m²

1 LEVEL 0
AA-001 SCALE 1 : 75

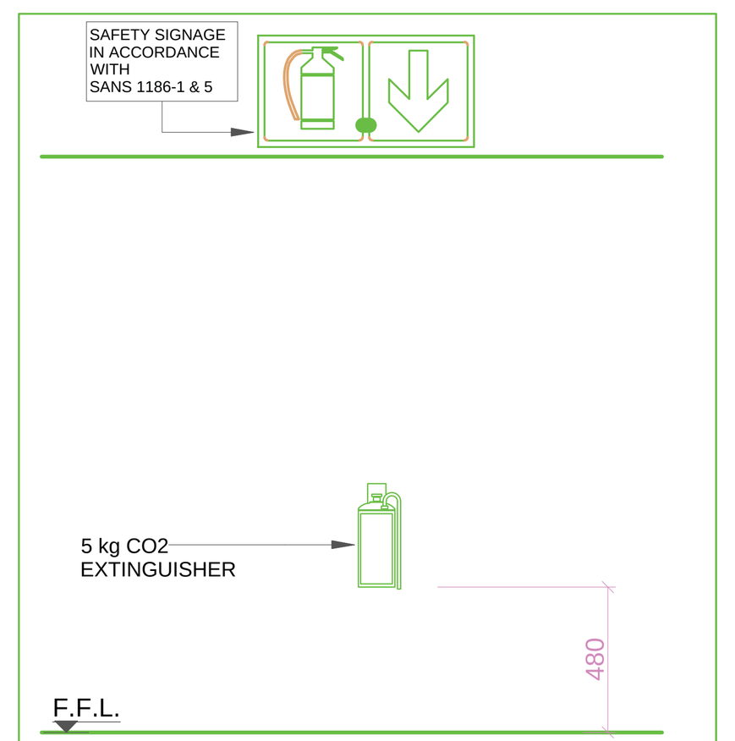
MASTER
2 3 FEB 2017
AECOM TRANSNET



TYPE A
ELEVATION



TYPE B
ELEVATION



TYPE C
ELEVATION

SYMBOLS

SYM	DESCRIPTION	SYM	DESCRIPTION
F1	⬇ 🧯 ◎ 🚰	F4	⬇ ◎ 🧯
F7	⬇ ◎ 🚰	F10	⬇ 🧯 🚰
F13	⬇ 🧯	F14	⬇ ◎
F15	⬇ 🚰	F35	🔥
F53	⬇ 🧯 🪣	E1	🏃 →
E2	← 🏃	E3	⬇ 🏃
E4	← 🏃 →	E6	EXIT
E16	🏃 ╲ →	E17	← ╱ 🏃
E18	🏃 ╱ →	E19	← ╲ 🏃
→	ESCAPE DIRECTIONS	E25	Refuge area
🟪	LIFT SHAFT ENCLOSURES	🟩	EXIT ENCLOSURES
🟨	EXIT ACCESS ROUTES	🟧	SERVICE SHAFTS
▨	PLACE OF REFUGE	▬ ▬	2 HOUR FIRE RATED CONSTRUCTION
▬	1 HOUR FIRE RATED CONSTRUCTION	▬	½ HOUR FIRE RATED CONSTRUCTION
▬	½ HOUR CEILING FIRE SEPERATION	▬	1½ HOUR FIRE RATED CONSTRUCTION
▬ ▬	1½ HOUR INTUMESCENT PAINT	X	DOUBLE SIDED HANGING SIGN
FD-1	CLASS A, 1 HOUR FIRE RATED, SELF CLOSING FIRE DOOR		
FD-2	CLASS B, 2 HOUR FIRE RATED, SELF CLOSING FIRE DOOR		
FD-3	CLASS C, 2 HOUR FIRE RATED, SELF CLOSING PLANT ROOM DOOR		
FD-4	CLASS E, 1/2 HOUR FIRE RATED, SELF CLOSING FIRE DOOR		

DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

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FIRE AND SAFETY SIGNAGE NOTES

1. FIRE AND SAFETY SIGNAGE SHALL BE OF THE PHOTOLUMINESCENT TYPE AND COMPLY WITH SANS 1186-5.
2. ALL SIGNAGE SHALL BE INSTALLED ACCORDING TO SANS 10400 PART T, SANS 10114 AND TO THE LOCAL AUTHORITY.
3. THE MINIMUM SIGNAGE SIZE SHALL BE 150 mm x 150 mm.
4. THE SIGNS SHALL BE FIXED TO THE WALLS WITH WALL FIXING SCREWS AND RATED FOR THE TYPE OF WALL CONSTRUCTION THE SIGN IS BEING FIXED TO. DOUBLE SIDED TAPE OR ANY FORM OF ADHESIVE SHALL NOT BE PERMITTED.
5. SUSPENDED SIGNS SHALL BE HUNG WITH PROPER LUGS AND STEEL CABLING AND MUST BE DOUBLE SIDED. HAND TWISTED WIRES ARE NOT ACCEPTABLE.
6. THE SIGNS SHALL BE POSITIONED SO THAT THE BASE OF THE SIGN IS BETWEEN 2 m AND 2,5 m ABOVE FINISHED FLOOR LEVEL.

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NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	J.J.	N.J.	A.D.	15-02-2017

REVISIONS

CONTRACTOR/CONSULTANT

TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS

TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS

TITLE	NAME	SIGN	DATE
DRAWN	J. JOOSTE	[illegible]	15 02 17
CHECKED	N. JACOBS	[illegible]	15 02 17
DESIGNED	J. JOOSTE	[illegible]	15 02 17
CHECKED	A.N. DALLY	[illegible]	15 02 17

PR.ENG./PR.TECH./PR.ARCH
NAME A.N. DALLY DATE
SIGNATURE [illegible] 15 02 17
REG. NUMBER 9170004
SCALE: AS INDICATED A0

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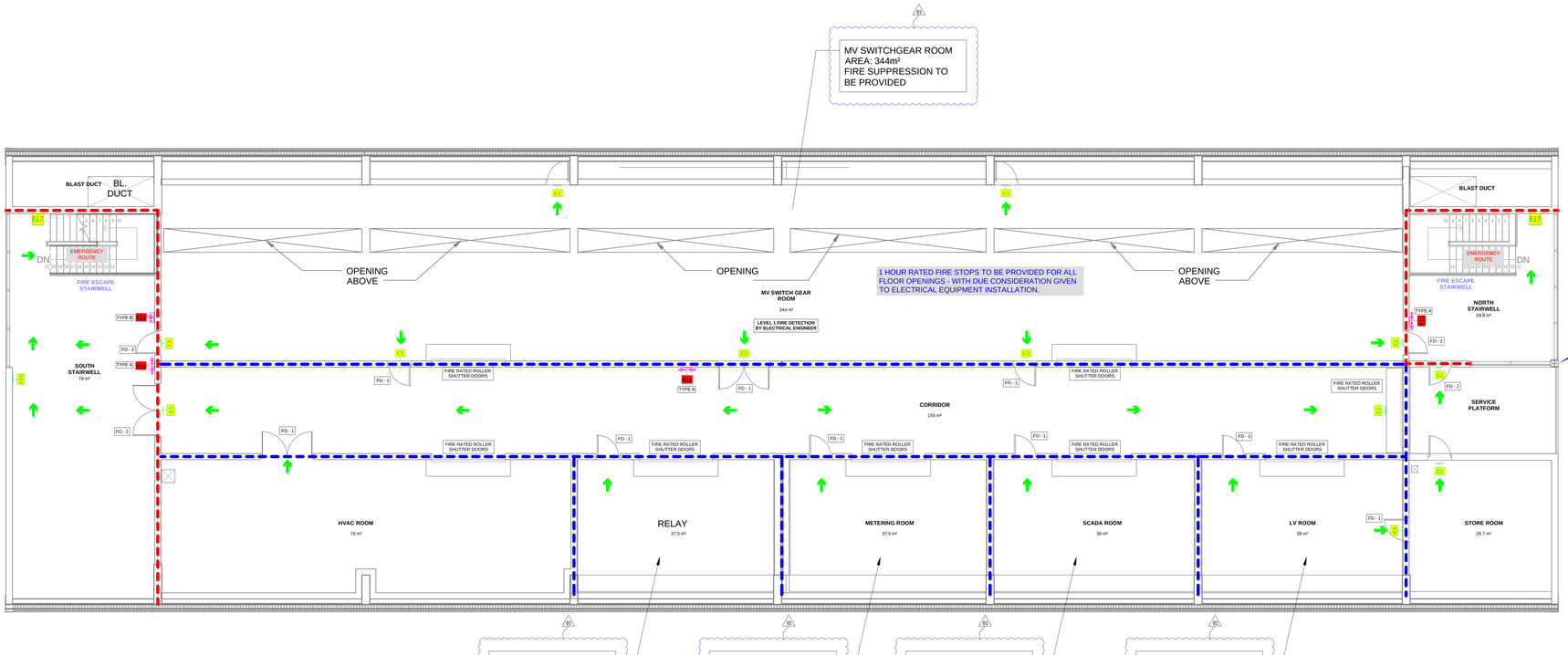
TRANSNET

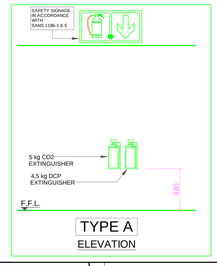
PORT OF SALDANHA

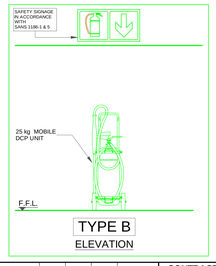
IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE
MAIN INTAKE SUBSTATION
LEVEL 00 FIRE PROTECTION LAYOUT

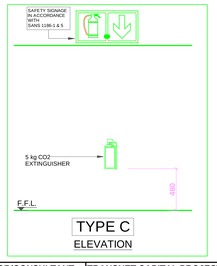
PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1 9 2 4 7 0 1	2	5 1 0	M	L A	0 0 1 1	0 1	0 0	AE



1 LEVEL 1
AA-002 | SCALE 1 : 75







SYMBOLS

SYM	DESCRIPTION	SYM	DESCRIPTION
E1		E9	
E2		E10	
E3		E11	
E5		E12	
E6		E1	
E7		E2	
E8		E3	
E10		E4	EXIT
E18		E17	
	ESCAPE DIRECTIONS	E18	
	LIFT SHAFT ENCLOSURES	E20	
	EXIT ENCLOSURES		
	EXIT ACCESS ROUTES		SERVICE SHAFTS
	PLACE OF REFUGE		2 HOUR FIRE RATED CONSTRUCTION
	1 HOUR FIRE RATED CONSTRUCTION		½ HOUR FIRE RATED CONSTRUCTION
	½ HOUR CEILING FIRE SEPERATION		1½ HOUR FIRE RATED CONSTRUCTION
	1½ HOUR INTUMESCENT PAINT	X	DOUBLE SIDED HANGING SIGN
FD-1	CLASS A, 1 HOUR FIRE RATED, SELF CLOSING FIRE DOOR		
FD-2	CLASS B, 2 HOUR FIRE RATED, SELF CLOSING FIRE DOOR		
FD-3	CLASS C, 2 HOUR FIRE RATED, SELF CLOSING PLANT ROOM DOOR		
FD-4	CLASS E, 1/2 HOUR FIRE RATED, SELF CLOSING FIRE DOOR		

MASTER
29-09-2020 TRANSNET
AECOM

DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

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FIRE AND SAFETY SIGNAGE NOTES

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2. ALL SIGNAGE SHALL BE INSTALLED ACCORDING TO SANS 10400 PART T, SANS 10114 AND TO THE LOCAL AUTHORITY.
3. THE MINIMUM SIGNAGE SIZE SHALL BE 150 mm x 150 mm.
4. THE SIGNS SHALL BE FIXED TO THE WALLS WITH WALL FIXING SCREWS AND RATED FOR THE TYPE OF WALL CONSTRUCTION THE SIGN IS BEING FIXED TO. DOUBLE SIDED TAPE OR ANY FORM OF ADHESIVE SHALL NOT BE PERMITTED.
5. SUSPENDED SIGNS SHALL BE HUNG WITH PROPER LUGS AND STEEL CABLING AND MUST BE DOUBLE SIDED. HAND TWISTED WIRES ARE NOT ACCEPTABLE.
6. THE SIGNS SHALL BE POSITIONED SO THAT THE BASE OF THE SIGN IS BETWEEN 2 m AND 2,5 m ABOVE FINISHED FLOOR LEVEL.

FIRE DETECTION AND SUPPRESSION NOTES

1. THE ROOMS FOR WHICH FIRE SUPPRESSION IS INDICATED SHALL BE EQUIPED WITH A NOVEC 1230 FIRE SUPPRESSION SYSTEM, DESIGNED, INSTALLED AND TESTED IN FULL COMPLIANCE WITH SANS 14520-1 & SANS 14520-5.
2. THE BUILDING'S FIRE DETECTION SYSTEM SHALL BE PROVIDED IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATIONS AND DRAWINGS ISSUED FOR THE PURPOSE OF THE WORKS.
3. THE FIRE SUPPRESSION SYSTEM SHALL BE ACTIVATED BY THE FIRE DETECTION SYSTEM REFERENCED IN NOTE 2.
4. REFER TO ARCHITECTURAL DRAWINGS WHEN CALCUALTING ROOM VOLUME.

AECOM
CAPE TOWN OFFICE
WATERSIDE PLACE, SOUTH GATE
TYGER WATERFRONT
C49L CRONJE DRIVE
TEL: +27 (0)21 950 7500
FAX: +27 (0)21 950 7502
REG. No. 1966/006628/07

NO	DESCRIPTION	BY	CHKD	APPD	DATE
01	FIRE SUPPRESSION TYPE CHANGED TO NOVEC 1230	A.J	J.J	W.S	21-09-2020
00	ISSUED FOR CONSTRUCTION	J.J.	N.J.	A.D.	15-02-2017

REVISIONS

CONTRACTOR/CONSULTANT			
TITLE	NAME	SIGN	DATE
DRAWN	A.J		21 09 20
CHECKED	S.V		21 09 20
DESIGNED	J.J		21 09 20
CHECKED	W.S		21 09 20

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE

PR.ENG./PR.TECH./PR.ARCH	
NAME	W. SEEVINCK
SIGNATURE	
DATE	21 09 20
REG. NUMBER	201370233
SCALE:	AS INDICATED

Transnet Capital Projects
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) REG. NO. 1990/000906/06
TABLE BAY BUILDING, TYGERBERG PARK,
163 UYS KRIGE DRIVE, PLATTEKLOOF, 8001
TEL: 021 940 1999
FAX: 086 677 2455

PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE
MAIN INTAKE SUBSTATION
LEVEL 01 FIRE PROTECTION LAYOUT

PROJECT NUMBER							OID	FBS			OID	TYPE	DRAWING NO.			SHEET	REV	ID
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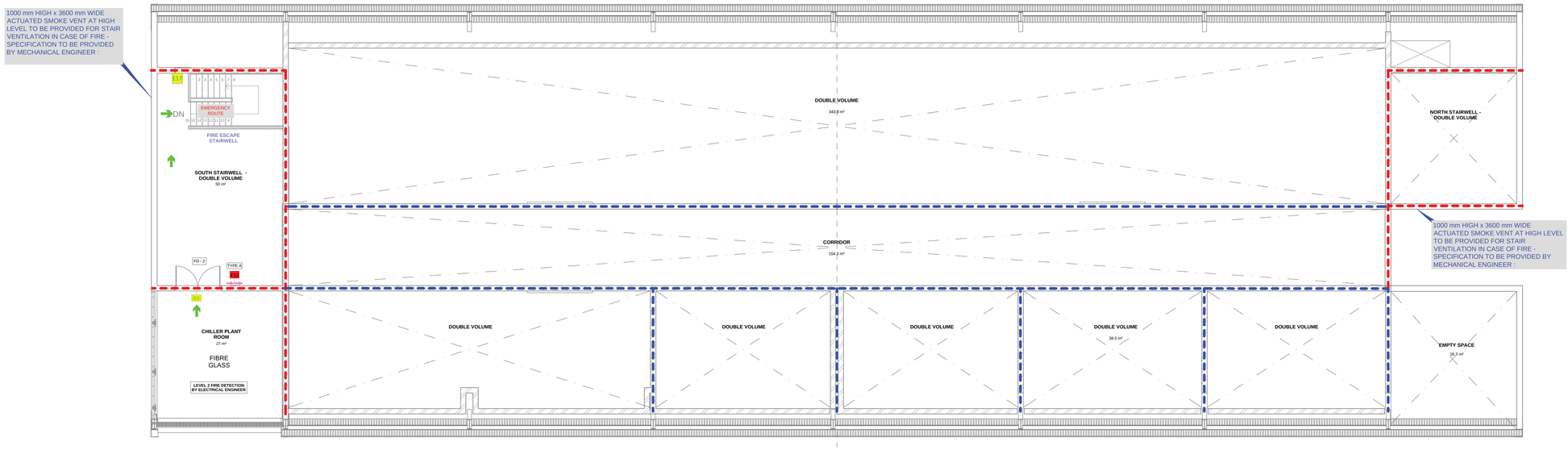
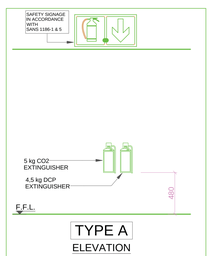
A0

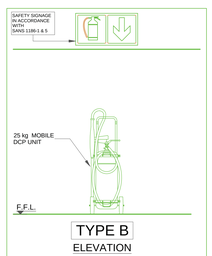


1 LEVEL 2
AA-003 | SCALE 1 : 75

MASTER
2 3 FEB 2017
AECOM
TRANSNET



TYPE A
ELEVATION



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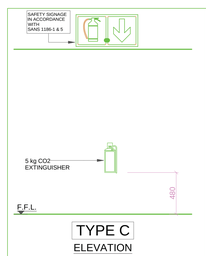
ELEVATION



TYPE C
ELEVATION

SYMBOLS

SYM	DESCRIPTION	SYM	DESCRIPTION
F1		F4	
F2		F5	
F3		F6	
F11		F8	
F9		E1	
E2		E3	
E4		E6	EXIT
E10		E17	
E16		E15	
	ESCAPE DIRECTIONS	E25	
	LIFT SHAFT ENCLOSURES		EXIT ENCLOSURES
	EXIT ACCESS ROUTES		SERVICE SHAFTS
	PLACE OF REFUGE		2 HOUR FIRE RATED CONSTRUCTION
	1 HOUR FIRE RATED CONSTRUCTION		½ HOUR FIRE RATED CONSTRUCTION
	½ HOUR CEILING FIRE SEPERATION		1½ HOUR FIRE RATED CONSTRUCTION
	1½ HOUR INTUMESCENT PAINT	X	DOUBLE SIDED HANGING SIGN
FD-1	CLASS A, 1 HOUR FIRE RATED, SELF CLOSING FIRE DOOR		
FD-2	CLASS B, 2 HOUR FIRE RATED, SELF CLOSING FIRE DOOR		
FD-3	CLASS C, 2 HOUR FIRE RATED, SELF CLOSING PLANT ROOM DOOR		
FD-4	CLASS E, 1/2 HOUR FIRE RATED, SELF CLOSING FIRE DOOR		

DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

GENERAL NOTES

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FIRE AND SAFETY SIGNAGE NOTES

1. FIRE AND SAFETY SIGNAGE SHALL BE OF THE PHOTOLUMINESCENT TYPE AND COMPLY WITH SANS 1186-5.
2. ALL SIGNAGE SHALL BE INSTALLED ACCORDING TO SANS 10400 PART T, SANS 10114 AND TO THE LOCAL AUTHORITY.
3. THE MINIMUM SIGNAGE SIZE SHALL BE 150 mm x 150 mm.
4. THE SIGNS SHALL BE FIXED TO THE WALLS WITH WALL FIXING SCREWS AND RATED FOR THE TYPE OF WALL CONSTRUCTION THE SIGN IS BEING FIXED TO. DOUBLE SIDED TAPE OR ANY FORM OF ADHESIVE SHALL NOT BE PERMITTED.
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6. THE SIGNS SHALL BE POSITIONED SO THAT THE BASE OF THE SIGN IS BETWEEN 2 m AND 2,5 m ABOVE FINISHED FLOOR LEVEL.

AECOM

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CARL CRONJE DRIVE

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REG. No. 1966/006628/07

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	J.J.	N.J.	A.D.	15-02-2017

REVISIONS

CONTRACTOR/CONSULTANT

TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS

TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS

TITLE	NAME	SIGN	DATE
DRAWN	J. JOOSTE		15 02 17
CHECKED	N. JACOBS		15 02 17
DESIGNED	J. JOOSTE		15 02 17
CHECKED	A. DALLY		15 02 17

PR.ENG./PR.TECH./PR.ARCH

		DATE
NAME	A.N. DALLY	
SIGNATURE		15 02 17
REG. NUMBER	9170004	
SCALE:	AS INDICATED	A0

Transnet Capital Projects
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1990/000906/06
TABLE BAY BUILDING, TYGERBERG PARK,
163 UYS KRIGE DRIVE, PLATTEKLOOF,
8001
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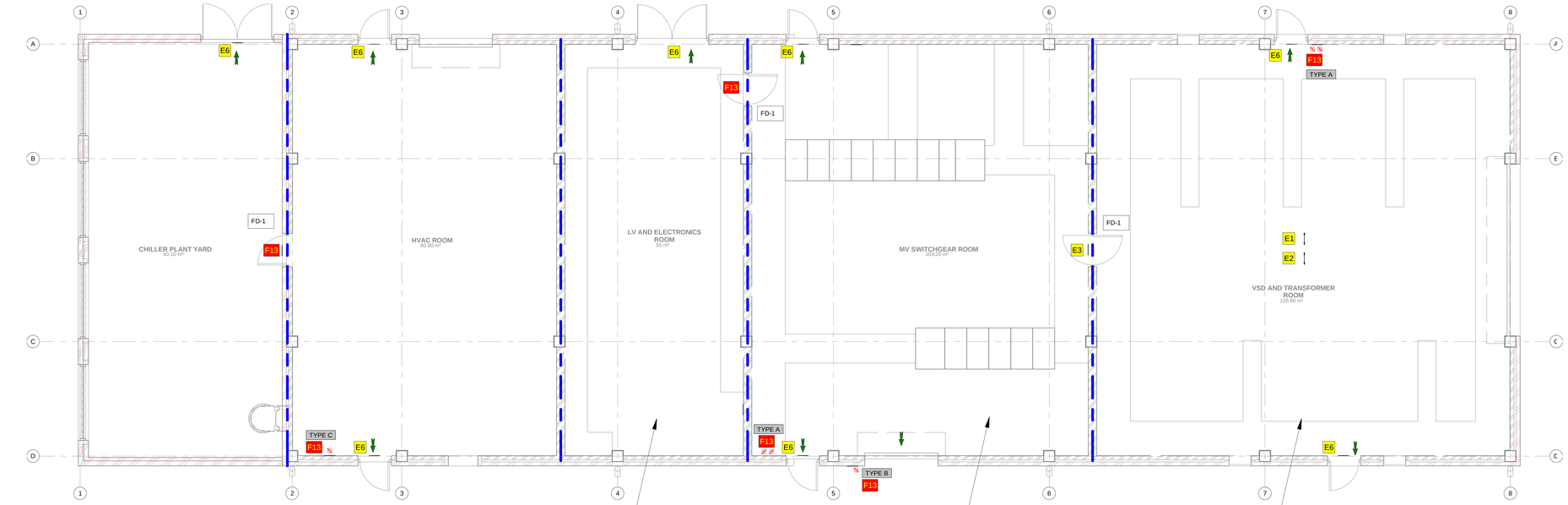
FAX: 086 677 2455

PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE
MAIN INTAKE SUBSTATION
LEVEL 02 FIRE PROTECTION LAYOUT

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
192470	2	510	M	LA	0013	01	00	AE



1
0014

LV AND ELECTRONICS ROOM
AREA: 55 m²
FIRE SUPPRESSION TO
BE PROVIDED

MV SWITCHGEAR ROOM
AREA: 103.2 m²
FIRE SUPPRESSION TO
BE PROVIDED

VSD & TRANSFORMER ROOM
AREA: 126.8 m²
FIRE SUPPRESSION TO
BE PROVIDED

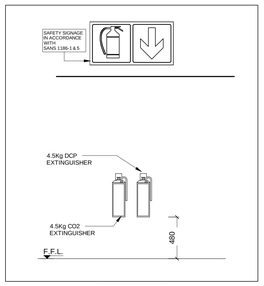
DETECTION: PLEASE SEE COMMENT ON DRAWING 1924701-2-510-M-GA-004-01-AE REV 03/0005-01-AE REV 03/0006-01-AE REV03

LEVEL 00 - FIRE PROTECTION PLAN

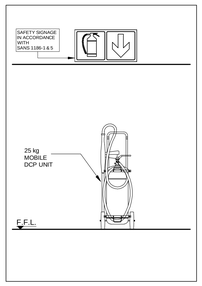
SCALE 1 : 50

SYMBOLS LEGEND

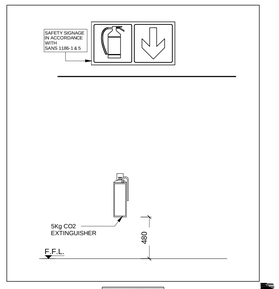
SYM	DESCRIPTION	QTY	SYM	DESCRIPTION	QTY
F1			F4		
F7			F20		
F11			F14		
F16			F26		
F9			E1		
E2			E3		
E6	EXIT		E16		
E17			E18		
E19			E25		
	DCP FIRE EXTINGUISHER			FOAM FIRE EXTINGUISHER	
	CO2 FIRE EXTINGUISHER			30m FIRE HOSEREEL	
	Ø65 FIRE HYDRANT			SMOKE DETECTOR	
FAC P	FIRE ALARM CONTROL PANEL			MANUAL CALL POINT	
	WALL MOUNTED SOUNDER			SAND BUCKET	
	LIFT SHAFT ENCLOSURES			EXIT ENCLOSURES	
	EXIT ACCESS ROUTES			SERVICE SHAFTS	
	PLACE OF REFUGE			2 HOUR FIRE RATED CONSTRUCTION	
	30MINUTES FIRE RATED CONSTRUCTION			30MINUTES CEILING FIRE SEPERATION	
	1 HOUR FIRE RATED CONSTRUCTION			1.5 HOUR FIRE RATED CONSTRUCTION	
	TWIN BOOSTER FIRE CONNECTION			ESCAPE DIRECTION	
FD - 1	1 HOUR FIRE RATED SINGLE LEAF CLASS A SELF-CLOSING FIRE DOOR.		FD - 2	1 HOUR FIRE RATED DOUBLE LEAF CLASS A SELF-CLOSING FIRE DOOR.	



TYPE A
ELEVATION



TYPE B
ELEVATION



TYPE C
ELEVATION

GENERAL NOTES

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DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

AECOM
CAPE TOWN OFFICE
WATERSIDE PLACE, SOUTH GATE
TYGER WATERFRONT
CARL CRONJE DRIVE
TEL: +27 (0)21 950 7500
FAX: +27 (0)21 950 7502
REG. No. 1966/006628/07

NO	DESCRIPTION	BY	CHKD	APPD	DATE
02	FIRE SUPPRESSION TYPE CHANGED TO NOVEC 1230	AJ	JJ	W.S	21-09-20
01	FIRE SUPPRESSION AREAS ADDED. SIGNAGE MODIFIED.	TN	SV	WS	16-09-19
00	ISSUED FOR CONSTRUCTION	AJ	JJ	AD	30-05-18

REVISIONS

CONTRACTOR/CONSULTANT	NAME	SIGN	DATE
DRAWN	AJ		21 09 20
CHECKED	SV		21 09 20
DESIGNED	JJ		21 09 20
CHECKED	WS		21 09 20

OPERATING DIVISIONS	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS	NAME	SIGN	DATE

PR.ENG./PR.TECH./PR.ARCH		
NAME	W. SEEVINCK	DATE
SIGNATURE		21 09 20
REG. NUMBER	2013702/33	
SCALE:	AS SHOWN	A0

Transnet Capital Projects
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) REG. NO. 1990/000906/06
TABLE BAY BUILDING, TYGERBERG PARK,
163 LVS KRIGE DRIVE, PLATTEKLOOF,
8001
TEL: 021 940 1999
FAX: 086 677 2455

PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION M
FIRE PLANS

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
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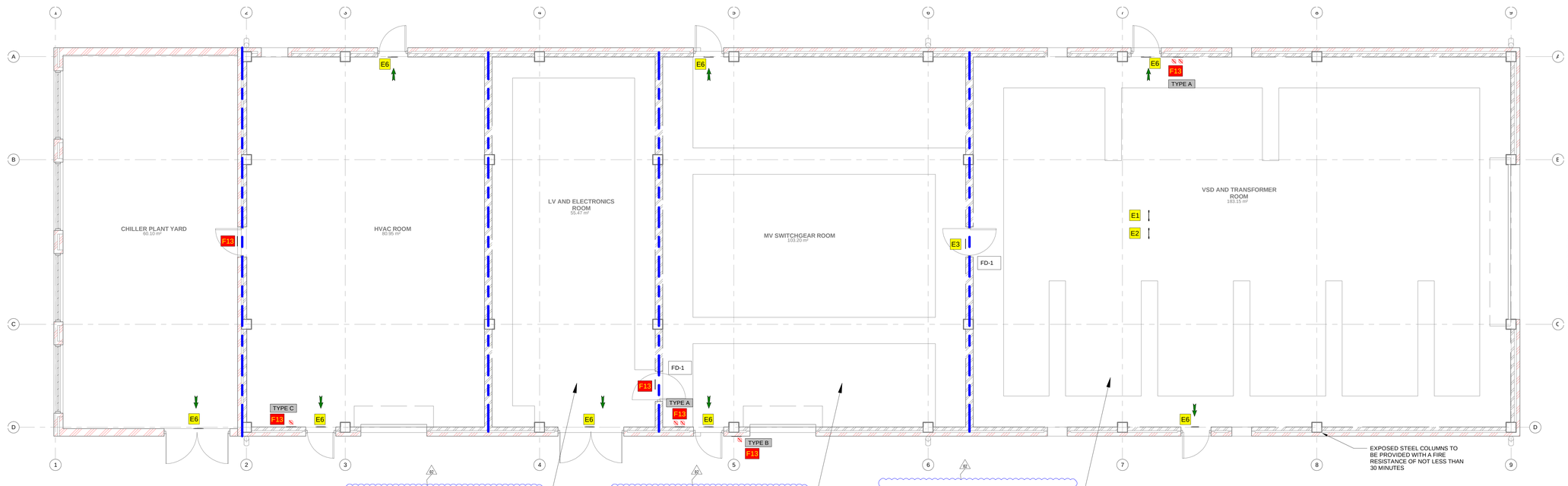
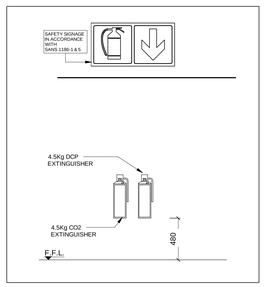
MASTER
29-09-2020



1 LEVEL 00 - FIRE PROTECTION PLAN

0016 | SCALE 1 : 50

SYMBOLS LEGEND					
SYM	DESCRIPTION	QTY	SYM	DESCRIPTION	QT
F1			F4		
F7			F20		
F11			F24		
F16			F26		
F5			E1		
E2			E3		
E6	EXIT		E16		
E17			E18		
E19			E25		
	DCP FIRE EXTINGUISHER			FOAM FIRE EXTINGUISHER	
	CO2 FIRE EXTINGUISHER			30m FIRE HOSEREEL	
	Ø65 FIRE HYDRANT			SMOKE DETECTOR	
FAC P	FIRE ALARM CONTROL PANEL			MANUAL CALL POINT	
	WALL MOUNTED SOUNDER			SAND BUCKET	
	LIFT SHAFT ENCLOSURES			EXIT ENCLOSURES	
	EXIT ACCESS ROUTES			SERVICE SHAFTS	
	PLACE OF REFUGE			2 HOUR FIRE RATED CONSTRUCTION	
	30MINUTES FIRE RATED CONSTRUCTION			30MINUTES CEILING FIRE SEPERATION	
	1 HOUR FIRE RATED CONSTRUCTION			1.5 HOUR FIRE RATED CONSTRUCTION	
	TWIN BOOSTER FIRE CONNECTION			ESCAPE DIRECTION	
FD-1	1 HOUR FIRE RATED SINGLE LEAF CLASS A SELF-CLOSING FIRE DOOR.		FD-2	1 HOUR FIRE RATED DOUBLE LEAF CLASS A SELF-CLOSING FIRE DOOR.	



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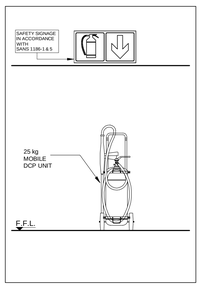
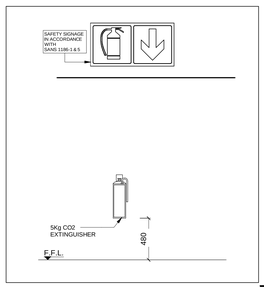
ELEVATION



TYPE B
ELEVATION



TYPE C
ELEVATION

MASTER
29-09-2020

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DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

AECOM
CAPE TOWN OFFICE
WATERSIDE PLACE, SOUTH GATE
TYGER WATERFRONT
CARL CRONJE DRIVE
TEL: +27 (0)21 950 7500
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REG. No. 1966/006628/07

NO	DESCRIPTION	BY	CHKD	APPD	DATE
02	FIRE SUPPRESSION TYPE CHANGED TO NOVEC 1230	AJ	JJ	W.S	21-09-20
01	FIRE SUPPRESSION AREAS ADDED	TN	SV	WS	16-09-19
00	ISSUED FOR CONSTRUCTION	AJ	JJ	AD	30-05-18

REVISIONS

CONTRACTOR/CONSULTANT						
TITLE	NAME	SIGN	DATE			
DRAWN	AJ		21	09	20	
CHECKED	SV		21	09	20	
DESIGNED	JJ		21	09	20	
CHECKED	WS		21	09	20	

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE

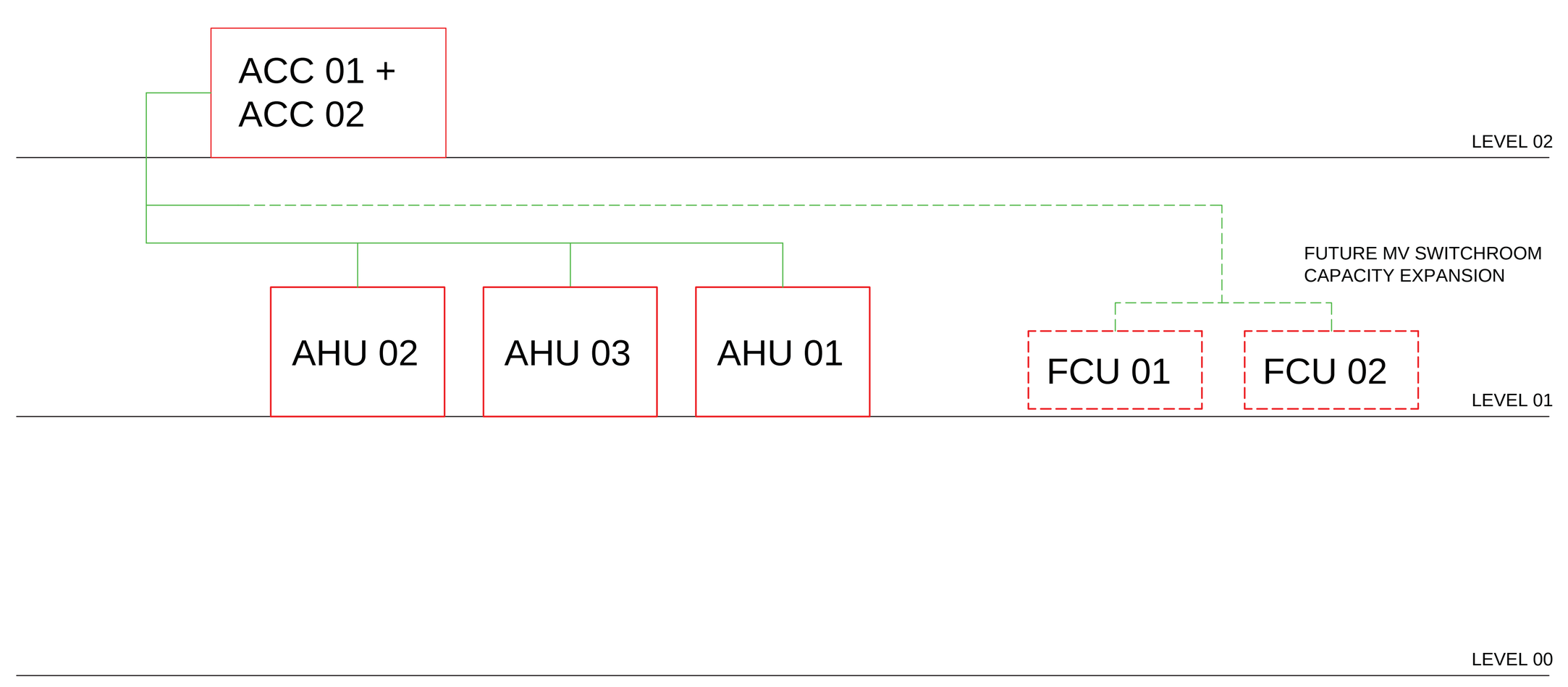
PR.ENG./PR.TECH./PR.ARCH				
NAME	W. SEEVINCK		DATE	
SIGNATURE		21	09	20
REG. NUMBER	201370233			
SCALE:	AS SHOWN			A0

Transnet Capital Projects
TRANSNET LTD. (TRADING AS TRANSNET CAPITAL PROJECTS) REG. NO. 1990/000905/06
TABLE BAY BUILDING, TYGERBERG PARK,
163 UYS KRIGE DRIVE, PLATTEKLOOF,
8001
TEL: 021 940 1999
FAX: 086 677 2455

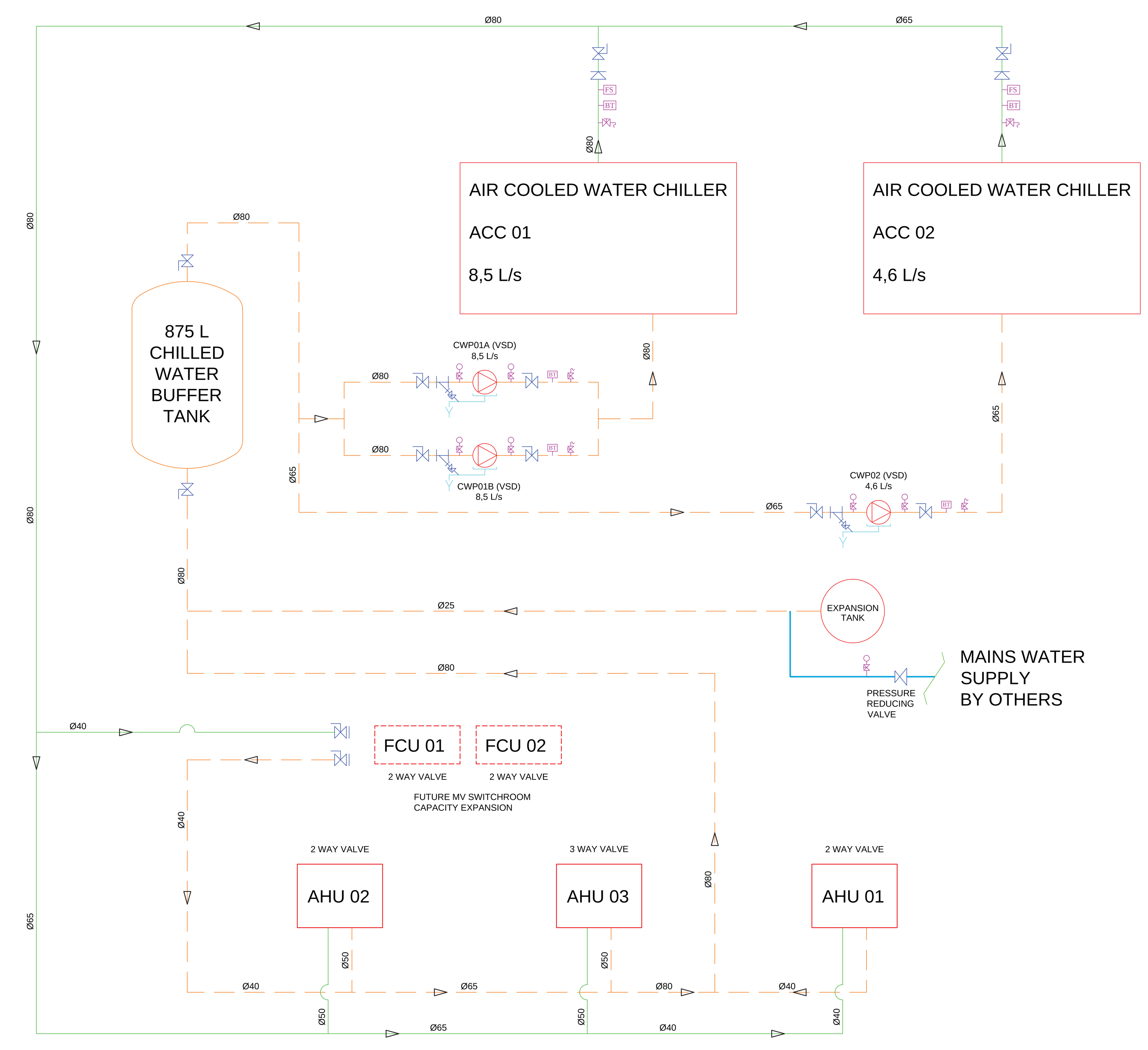
PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION N
FIRE PLANS

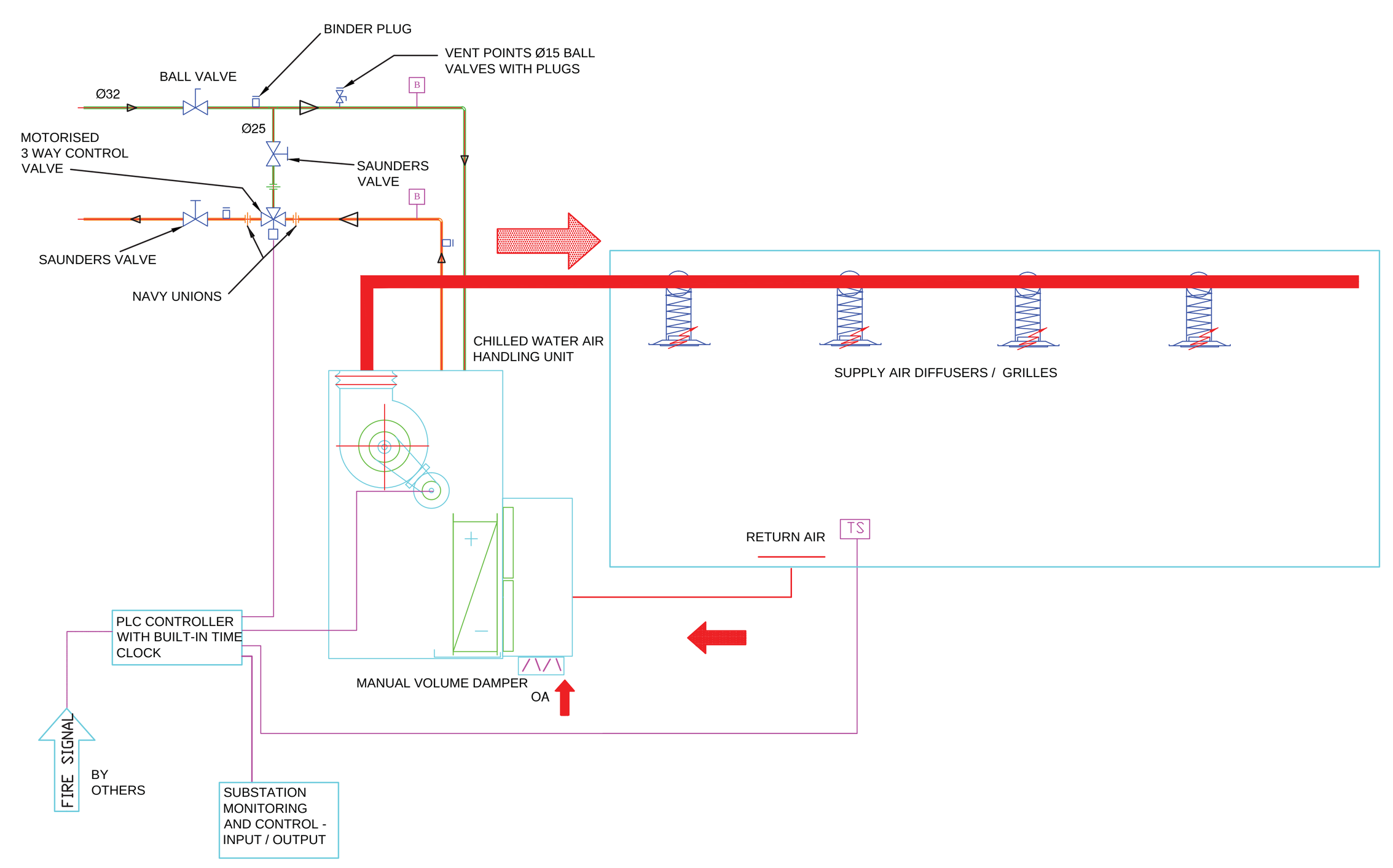
PROJECT NUMBER									OD	FBS		DIS	TYPE	DRAWING NO.			SHEET		REV	ID
1	9	2	4	7	0	1			2	5	1	0	M	L	A	0	0	1	6	0	1	02	AE



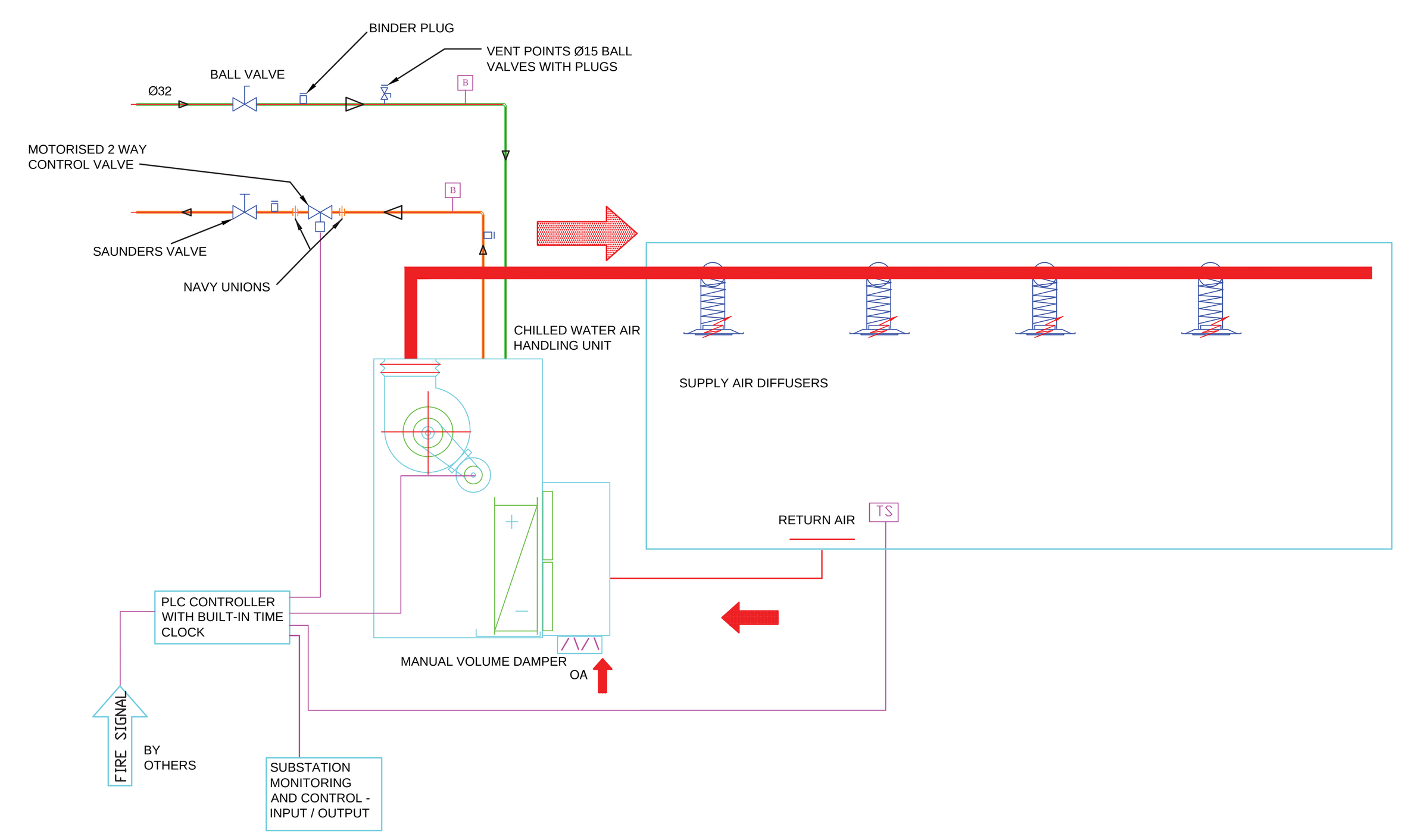
SCHEMATIC ELEVATION



SYSTEM SCHEMATIC



TYPICAL AHU PIPING AND CONTROL SCHEMATIC - 3-WAY VALVE



TYPICAL AHU PIPING AND CONTROL SCHEMATIC - 2-WAY VALVE

	BUTTERFLY SHUT OFF VALVE		CHECK VALVE		THERMOMETER WELL ONLT 20dia	S	SUMMIT POINT 20dia
	MOTORISED TWO WAY VALVE		GLYCERINE PRESSURE GAUGE		FLOW CONTROL METER	FM	SIGNET FLOW METER 50dia
	THREE WAY VALVE		BALL VALVE AND S TUBE 15dia	BT	BINDER TEST POINT 10dia	WT	WATER TREATMENT SOCKET 20dia BALL VALVE
	BALANCING VALVE		DRAIN POINT : CHILLER 25dia AHU 20dia	B	BMS TEMP POINT 15dia	FS	FLOW SWITCH 25dia
	STRAINER WITH 32dia BALL VALVE		SHUT OFF VALVE	WT DP	WATER TREATMENT DOSING POT 20dia BALL VALVE		MAKE UP SYSTEM 25dia
EM	ENERGY METER			TS	TEMPERATURE SENSOR		

AHU X

EQUIPMENT SHOWN WITH A DASHED OUTLINE DOES NOT FORM PART OF THE INITIAL INSTALLATION

MASTER
10 FEB 2017
AECOM
TRANSNET

DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

NOTES

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AECOM

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TYGER WATERFRONT
CARL CRONJE DRIVE

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FAX: +27 (0)21 950 7502
REG. No. 1966/006628/07

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	KC	JJ	AD	27-01-17

REVISIONS

CONTRACTOR/CONSULTANT

TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS

TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS

TITLE	NAME	SIGN	DATE
DRAWN	K.C.	[illegible]	27 01 17
CHECKED	J.J.	[illegible]	27 01 17
DESIGNED	J.J.	[illegible]	27 01 17
CHECKED	A.D.	[illegible]	27 01 17

PR.ENG./PR.TECH./PR.ARCH

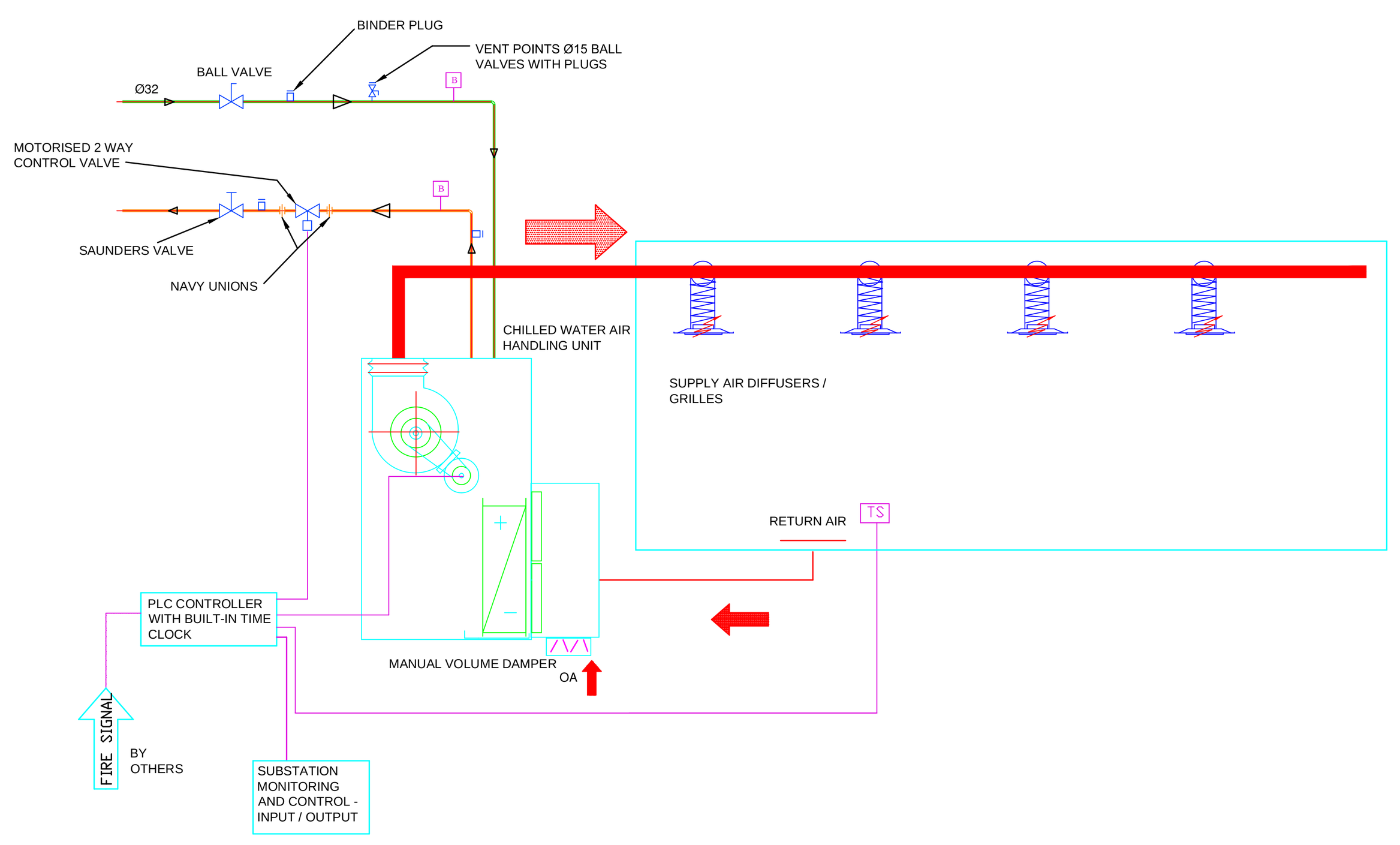
NAME	ANDREW DALLY	DATE
SIGNATURE	[illegible]	27 01 17
REG. NUMBER	9170004	
SCALE	N.T.S.	A0

Transnet Capital Projects
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1990/000900/06
TABLE BAY BUILDING, TYGERBERG PARK,
163 UYS KRIGE DRIVE, PLATTEKLOOF, 8001
TEL: 021 940 1999
FAX: 086 677 2455
TRANSNET

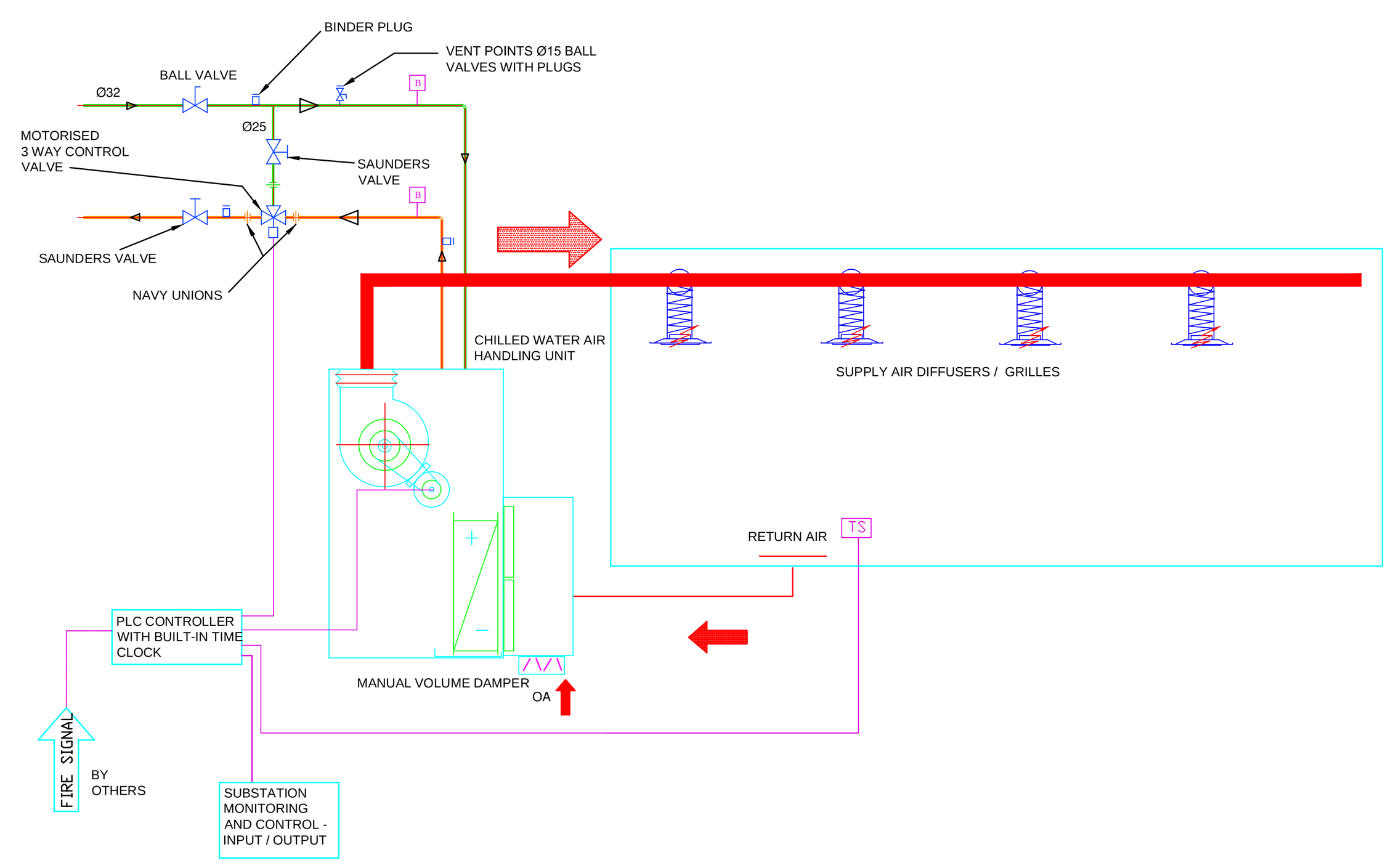
PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
MAIN INTAKE SUBSTATION
CHILLED WATER SCHEMATIC

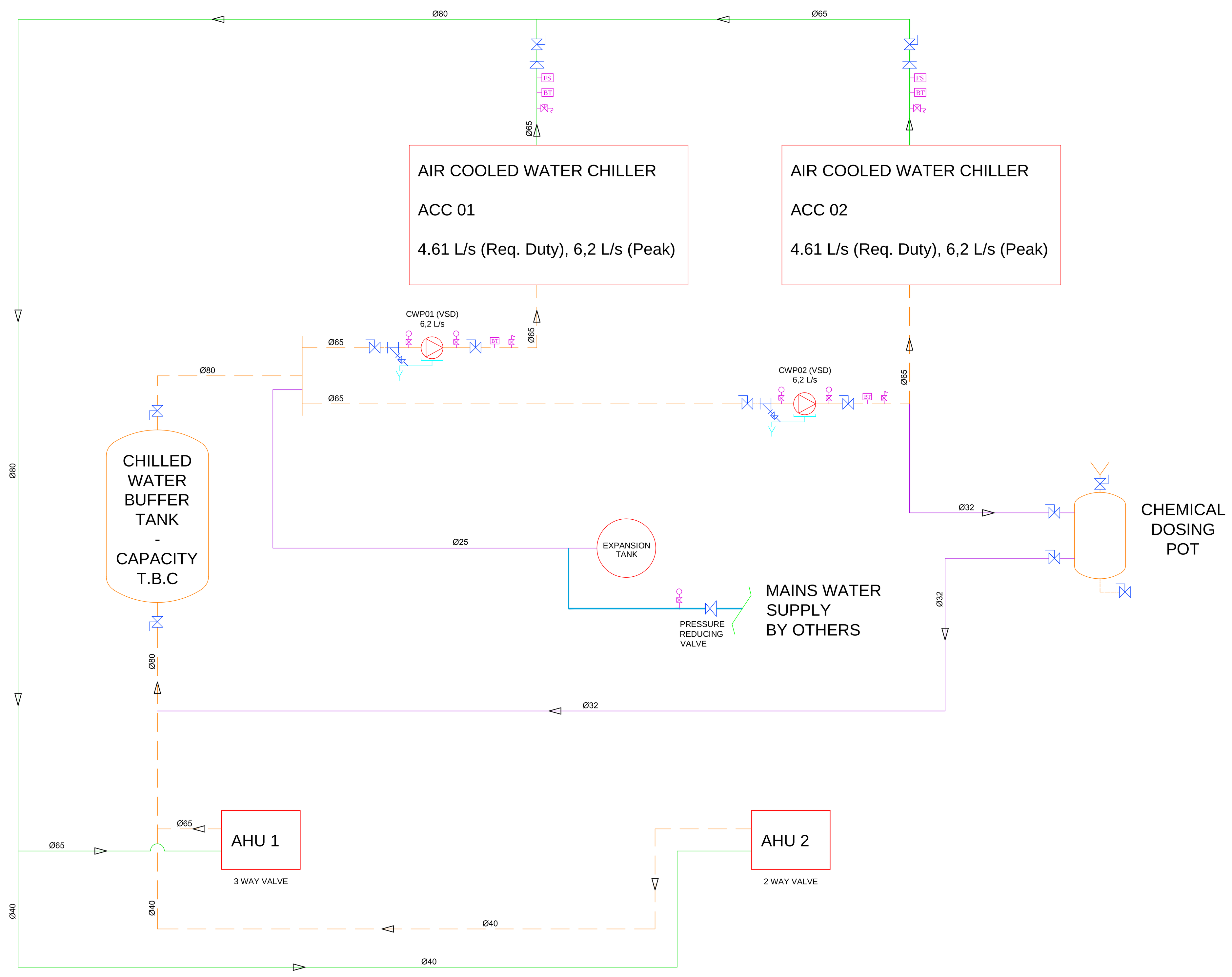
PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1 9 2 4 7 0 1	2	5 1 0	M	S D	0 0 0 4	0 1	0 0	AE



TYPICAL AHU PIPING AND CONTROL SCHEMATIC - 2-WAY VALVE



TYPICAL AHU PIPING AND CONTROL SCHEMATIC - 3-WAY VALVE



SYSTEM SCHEMATIC

	BUTTERFLY SHUT OFF VALVE		CHECK VALVE		THERMOMETER WELL ONLT 20dia	S	SUMMIT POINT 20dia
	MOTORISED TWO WAY VALVE		GLYCERINE PRESSURE GAUGE		FLOW CONTROL METER	FM	SIGNET FLOW METER 50dia
	THREE WAY VALVE		BALL VALVE AND S TUBE 15dia	BT	BINDER TEST POINT 10dia	WT	WATER TREATMENT SOCKET 20dia BALL VALVE
	BALANCING VALVE		DRAIN POINT : CHILLER 25dia AHU 20dia	B	BMS TEMP POINT 15dia	FS	FLOW SWITCH 25dia
	STRAINER WITH 32dia BALL VALVE		SHUT OFF VALVE	WT DP	WATER TREATMENT DOSING POT 20dia BALL VALVE		MAKE UP SYSTEM 25dia
EM	ENERGY METER			TS	TEMPERATURE SENSOR		

MASTER
30 MAY 2018
AECOM TRANSNET

REFERENCE DRAWINGS

DRAWING NO.	REFERENCE
1924701-2-510-M-GA-0029	SUBSTATION M - HVAC GENERAL ARRANGEMENT LAYOUT

NOTES

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AECOM
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REG. No. 1966/006628/07

REVISIONS

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	KC	JJ	AD	30-05-2018

CONTRACTOR/CONSULTANT — TITLE | NAME | SIGN | DATE

OPERATING DIVISIONS — TITLE | NAME | SIGN | DATE

TRANSNET CAPITAL PROJECTS

TITLE	NAME	SIGN	DATE
DRAWN	K.C.		30 05 18
CHECKED	J.J.		30 05 18
DESIGNED	J.J.		30 05 18
CHECKED	A.D.		30 05 18

PR.ENG./PR.TECH./PR.ARCH

		DATE
NAME	ANDREW DALLY	
SIGNATURE		30 05 18
REG. NUMBER	9170004	
SCALE	N.T.S.	A0

Transnet Capital Projects
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1990/000900/06
TABLE BAY BUILDING, TYGERBERG PARK,
163 UYS KRIGE DRIVE, PLATTEKLOOF, 8001
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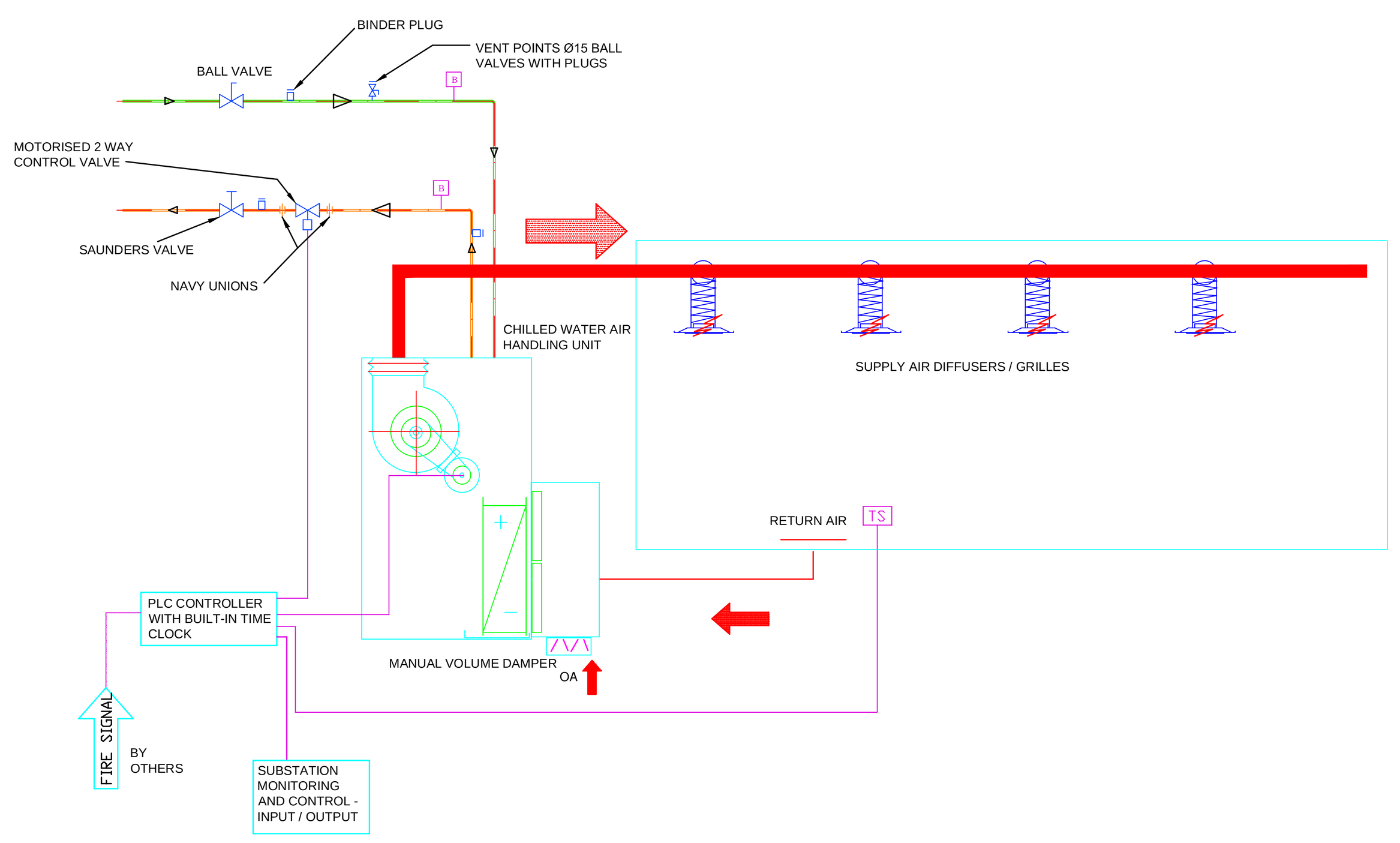
FAX: 086 677 2455
TRANSNET

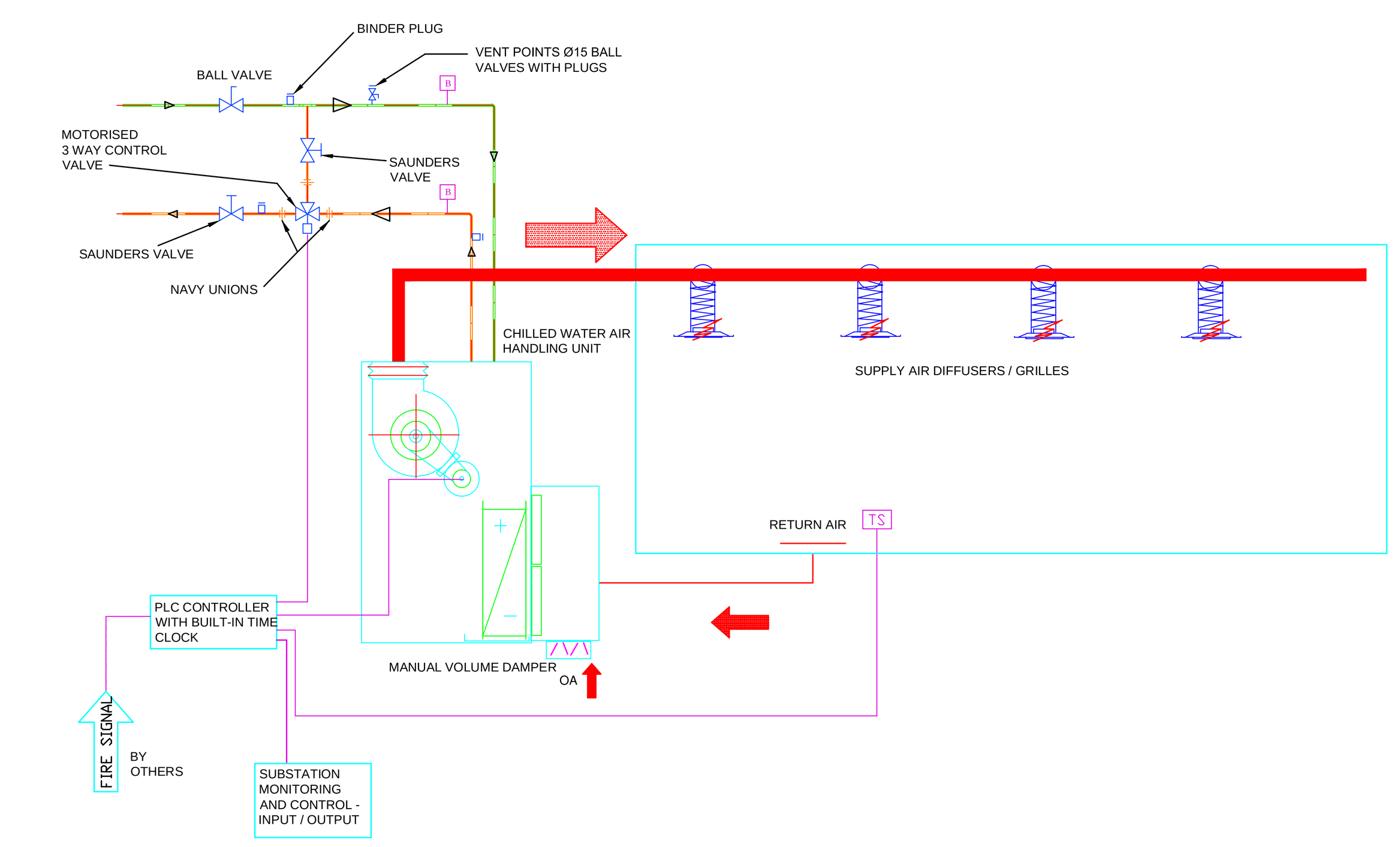
PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION M
CHILLED WATER SCHEMATIC

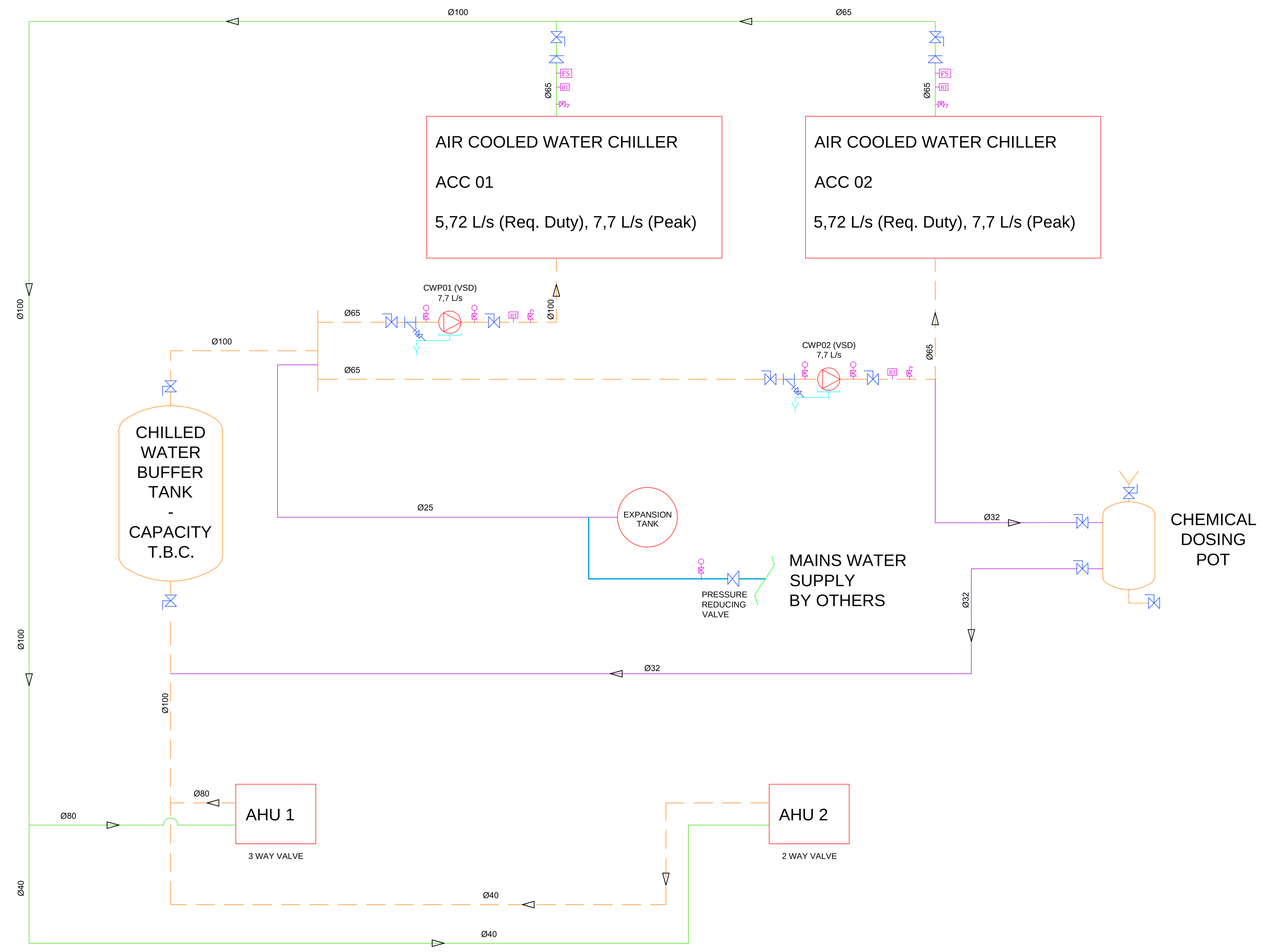
PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	510	M	SD	0005	01	00	AE



TYPICAL AHU PIPING AND CONTROL SCHEMATIC - 2-WAY VALVE



TYPICAL AHU PIPING AND CONTROL SCHEMATIC - 3-WAY VALVE



SYSTEM SCHEMATIC

BUTTERFLY SHUT OFF VALVE	CHECK VALVE	THERMOMETER WELL ONLT 20dia	SUMMIT POINT 20dia
MOTORISED TWO WAY VALVE	GLYCERINE PRESSURE GAUGE	FLOW CONTROL METER	SIGNET FLOW METER 50dia
THREE WAY VALVE	BALL VALVE AND S TUBE 15dia	BINDER TEST POINT 10dia	WATER TREATMENT SOCKET 20dia BALL VALVE
BALANCING VALVE	DRAIN POINT : CHILLER 25dia AHU 20dia	BMS TEMP POINT 15dia	FLOW SWITCH 25dia
STRAINER WITH 32dia BALL VALVE	SHUT OFF VALVE	WATER TREATMENT DOSING POT 20dia BALL VALVE	MAKE UP SYSTEM 25dia
EM ENERGY METER		TEMPERATURE SENSOR	

MASTER
30 MAY 2018
AECOM TRANSNET

DRAWING NO.	REFERENCE
1924701-2-510-M-GA-0031	SUBSTATION N - HVAC GENERAL ARRANGEMENT LAYOUT

REFERENCE DRAWINGS

NOTES

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REG. No. 1966/006628/07

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	KC	JJ	AD	30-05-2018

REVISIONS

CONTRACTOR/CONSULTANT

TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS

TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS

TITLE	NAME	SIGN	DATE
DRAWN	K.C.		30 05 18
CHECKED	J.J.		30 05 18
DESIGNED	J.J.		30 05 18
CHECKED	A.D.		30 05 18

PR.ENG./PR.TECH./PR.ARCH

NAME	ANDREW DALLY	DATE
SIGNATURE		30 05 18
REG. NUMBER	9170004	
SCALE	N.T.S.	A0

Transnet Capital Projects
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163 UYS KRIGE DRIVE, PLATTEKLOOF,
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TEL: 021 940 1999
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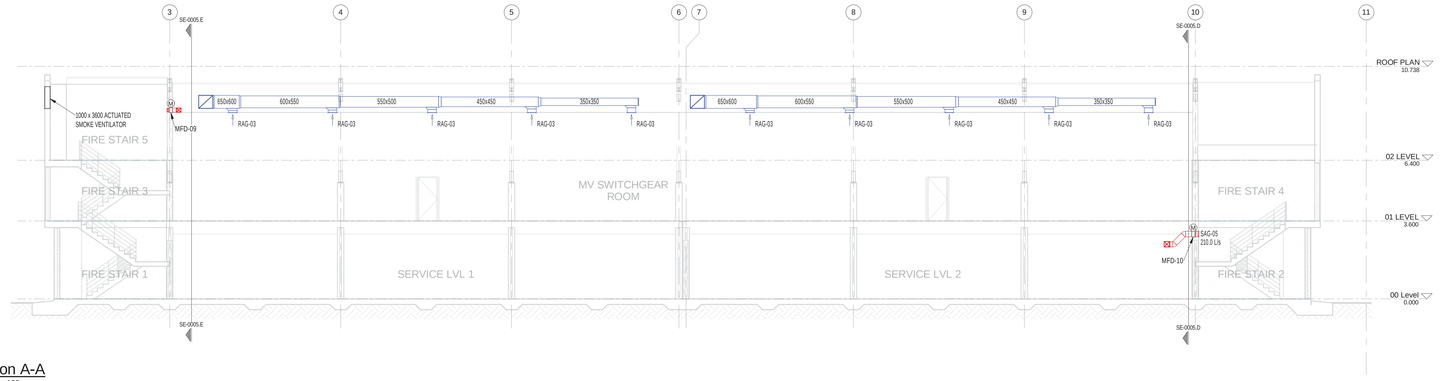
TRANSNET

PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION N
CHILLED WATER SCHEMATIC

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	510	M	SD	0007	01	00	AE



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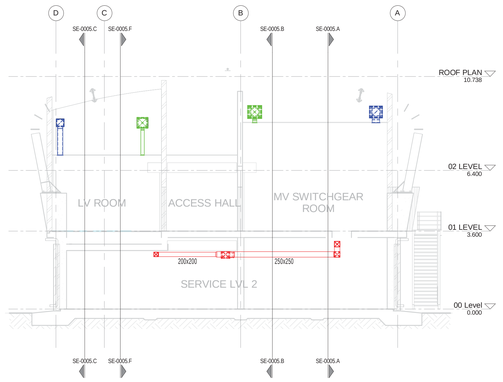
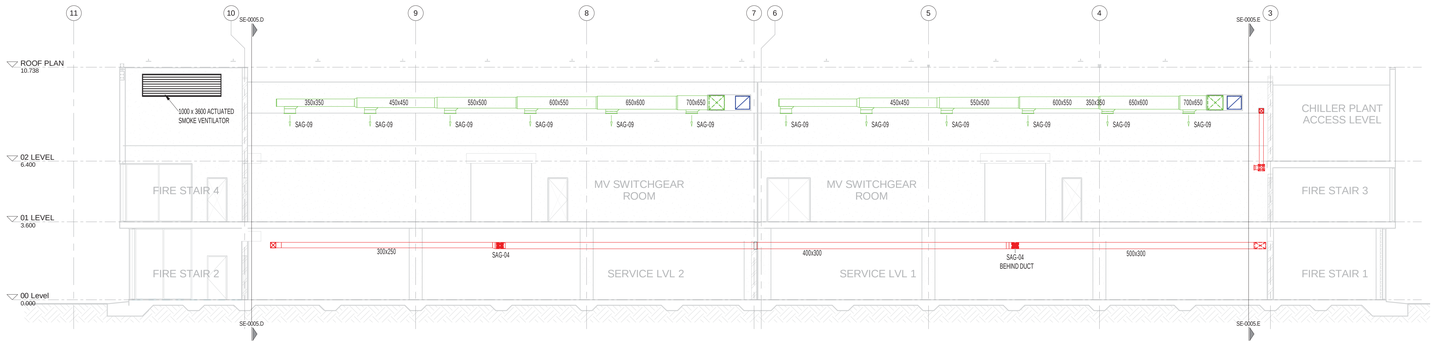


D | Section D-D
SE-0005 | SCALE 1 : 100



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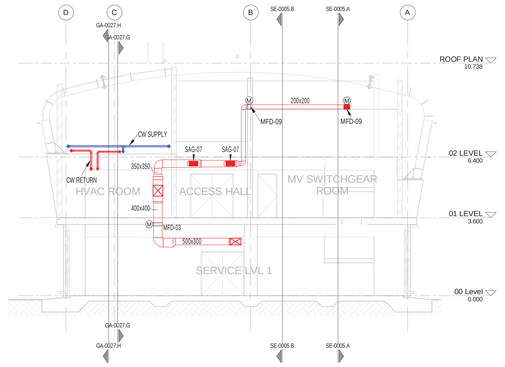
SE-0005 | SCALE 1 : 100



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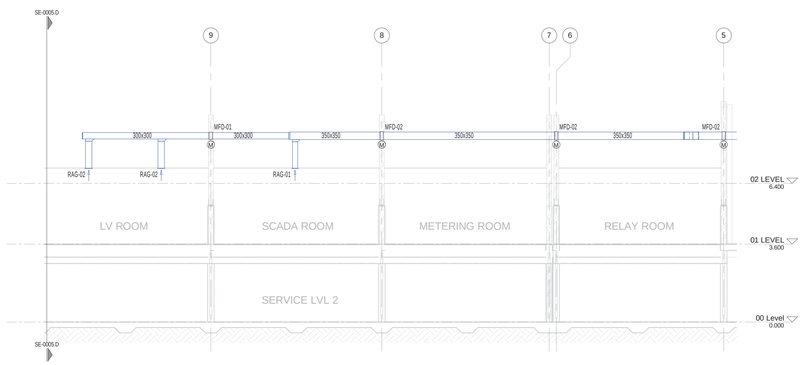
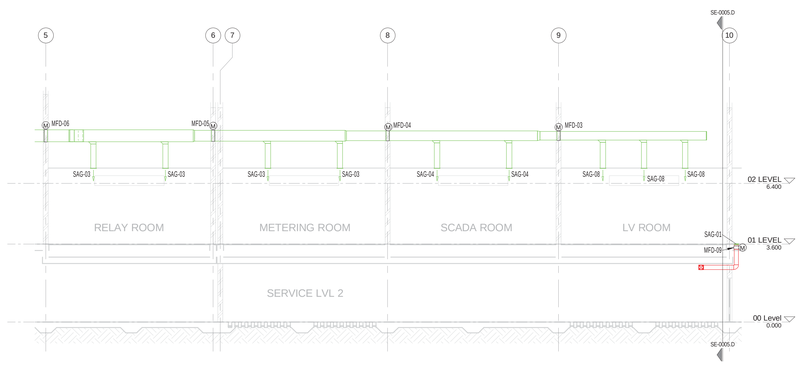


C | Section C-C
SE-0005 | SCALE 1 : 100



F | Section F-F
SE-0005 | SCALE 1 : 100

MASTER
10 FEB 2017
AECOM
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HVAC DUCT LEGEND

- FRESH AIR
- RETURN AIR
- SUPPLY AIR
- MECHANICAL EQUIPMENT/ AIR TERMINALS/ DUCT ACCESSORIES

LEGEND

FAF	FRESH AIR SUPPLY FAN
EAF	EXHAUST AIR FAN
∅	1-PHASE ISOLATOR LOCAL WEATHER PROOF ISOLATOR BY SITE ELECTRICIAN. HVAC CONTRACTOR TO PROVIDE FAN STARTER AND OVERLOAD PROTECTION FOR FAN.
∅	3-PHASE ISOLATOR: SITE ELECTRICIAN TO CONNECT ONTO 3-PHASE ISOLATOR IN ACP
	Ø50 TRAPPED DRAIN POINT BY PLUMBER
SAT	SOUND ATTENUATOR
	DOOR UNDERCUT 25mm BY OTHERS
M	MOTORIZED FIRE DAMPER WITH A 16 GAUGE GALVANIZED SLEEVE TO BE BUILT IN BY BUILDER
	FIRE DAMPER
T	WIRED REMOTE TEMPERATURE CONTROLLER
ACU	AIR CONDITIONING UNIT: INCLUDING LOCAL ISOLATOR BY HVAC CONTRACTOR
	BUTTERFLY DAMPER
	NON-RETURN DAMPER
	ON/OFF CANOPY SWITCH
	ELECTRICAL DISTRIBUTION PANEL

DRAWING NO.	REFERENCE
1924701-2-510-M-GA-0026-01	HVAC GENERAL ARRANGEMENT - LEVEL 00
1924701-2-510-M-GA-0027-01	HVAC GENERAL ARRANGEMENT - LEVEL 01
1924701-2-510-M-GA-0028-01	HVAC GENERAL ARRANGEMENT - LEVEL 02
1924701-2-510-M-SD-0005-01	CHILLED WATER SCHEMATIC

REFERENCE DRAWINGS

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REG. No. 1966/006628/07

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	K.C	J.J	A.D	2017-01-27

REVISIONS

CONTRACTOR/CONSULTANT			
TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE
DRAWN	K.C.		27 01 17
CHECKED	J.J.		27 01 17
DESIGNED	J.J.		27 01 17
CHECKED	A.D.		27 01 17

PR.ENG./PR.TECH./PR.ARCH		
NAME	A.N. DALLY	DATE
SIGNATURE		27 01 17
REG. NUMBER	9170004	
SCALE:	1:100	A0

Transnet Capital Projects
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) REG. NO. 1990/000906/06
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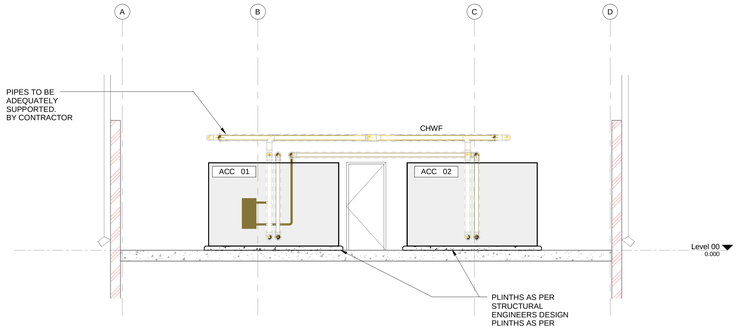
FAX: 086 677 2455

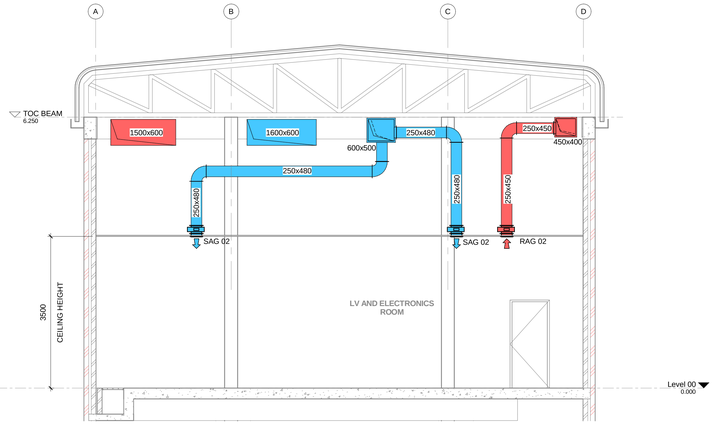
PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
MAIN INTAKE SUBSTATION
HVAC - SECTION LAYOUT

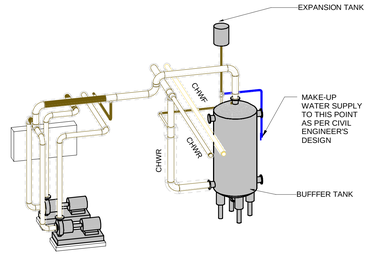
PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	510	M	SE	0005	01	00	AE



1 SECTION 1-1
0006 SCALE 1 : 50



4 SECTION 4-4
0006 SCALE 1 : 50



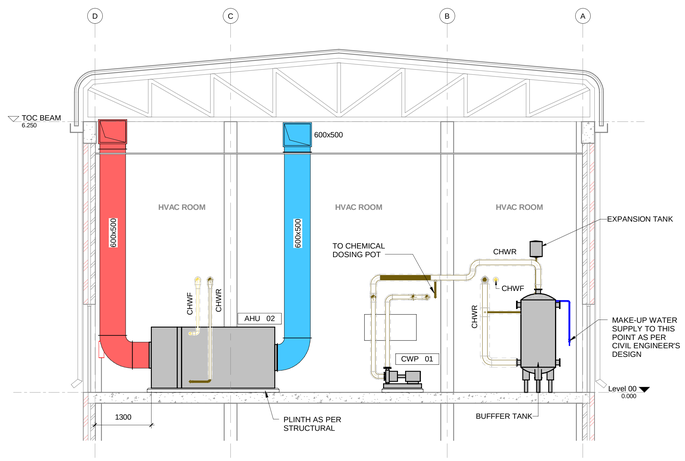
3D VIEW - BUFFER TANK SYSTEM
SCALE

HVAC PIPE LEGEND

- CHILLED WATER
- CHILLED WATER

HVAC LEGEND

- EXHAUST
- FRESH AIR/NATURAL
- RETURN
- SUPPLY
- FOUL
- MECHANICAL EQUIP/ AIR TERMINALS/ DUCT ACCESSORIES



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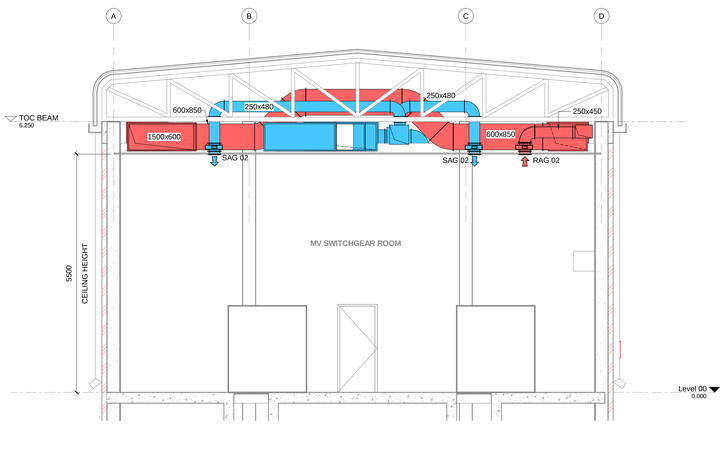
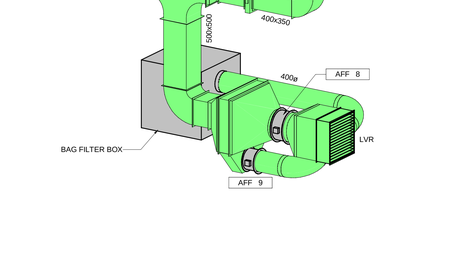
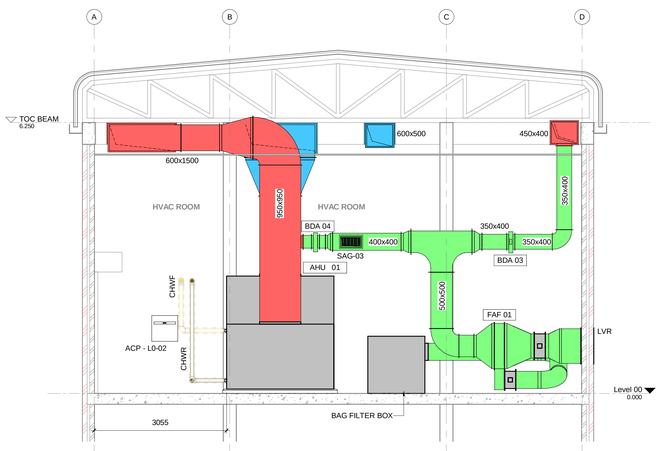
0006 SCALE 1 : 50



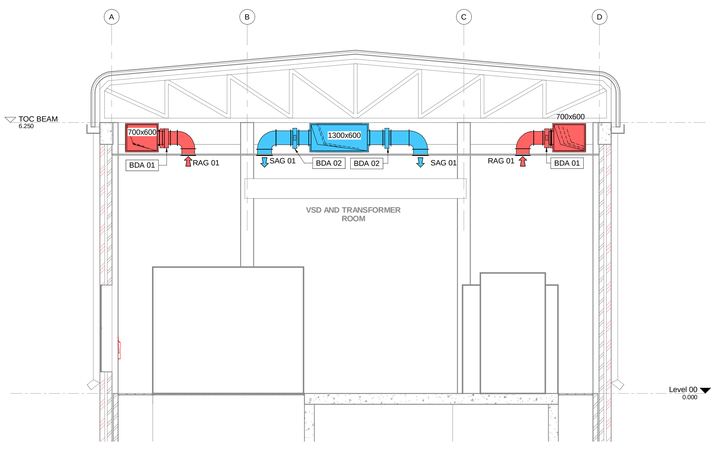
5 SECTION 5-5
0006 SCALE 1 : 50



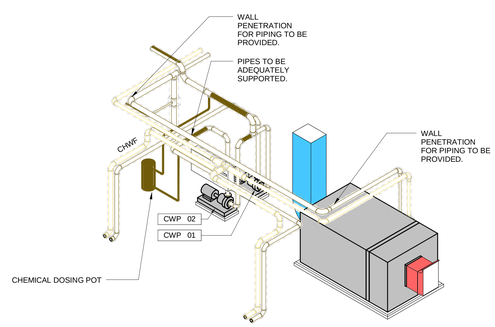
3D VIEW - DUST EXTRACTION
SCALE



3 SECTION 3-3
0006 SCALE 1 : 50



6 SECTION 6-6
0006 SCALE 1 : 50



3D VIEW - CHILLED WATER PUMP SYSTEM
SCALE

MASTER
30 MAY 2018
AECOM
TRANSNET

1924701-2-510-M-ST-0005	SUBSTATION M - STANDARD PIPING DETAILS
1924701-2-510-M-ST-0004	SUBSTATION M - STANDARD DUCTING DETAILS
1924701-2-510-M-GA-0029	SUBSTATION M - HVAC GENERAL ARRANGEMENT LAYOUT
DRAWING	REFERENC

REFERENCE DRAWINGS

GENERAL NOTES

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3. CAD FORMAT DRAWINGS ARE UNCONTROLLED AND MAY NOT REPRESENT THE DESIGN. THE PDF FORMAT DRAWINGS ISSUED BY AECOM ARE DEEMED TO BE THE ONLY TRUE REPRESENTATION OF THE AECOM DESIGN.
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REVISIONS

NO	DESCRIPTIO	BY	CHK	APPD	DATE
00	ISSUED FOR CONSTRUCTION	AJ	JJ	AD	30-05-2018

CONTRACTOR/CONSULTANT			
TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE
DRAWN	AJ		30 05 18
CHECKED	JJ		30 05 18
DESIGNED	JJ		30 05 18
CHECKED	AD		30 05 18

PR.ENG./PR.TECH./PR.ARCH			
NAME	A.N.DALY		DATE
SIGNATURE			30 05 18
REG. NUMBER	9170004		
SCALE:	AS SHOWN		A0

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163 UYS KRIGE DRIVE,
8001
TEL: 021 940 1999
FAX: 086 677 2455

PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION M
HVAC SECTION LAYOUT

PROJECT NUMBER							OD	FBS		DIS	TYPE	DRAWING NO.			SHEET		REV	ID
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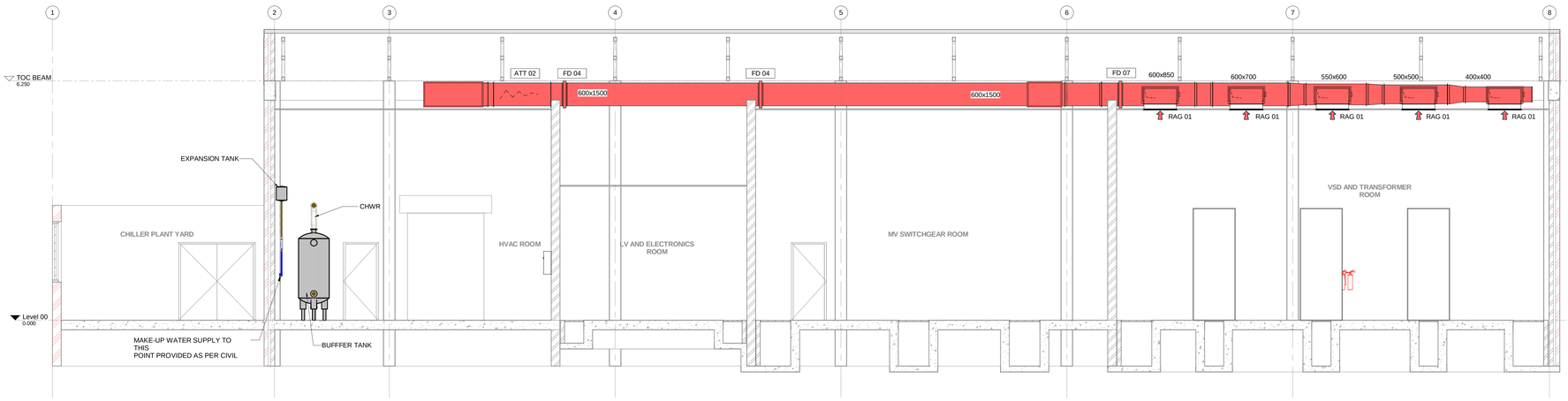
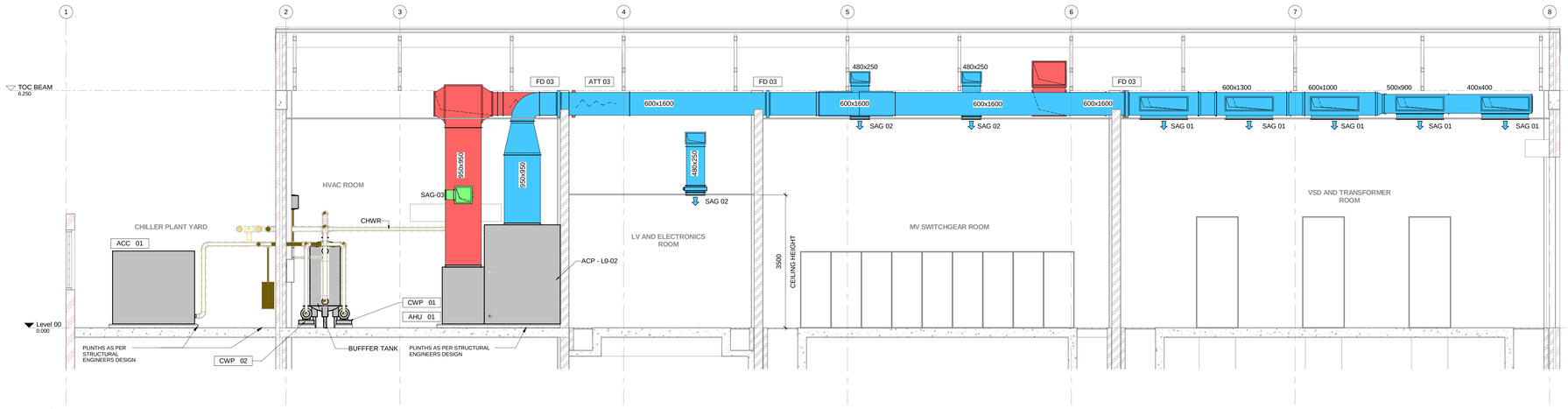
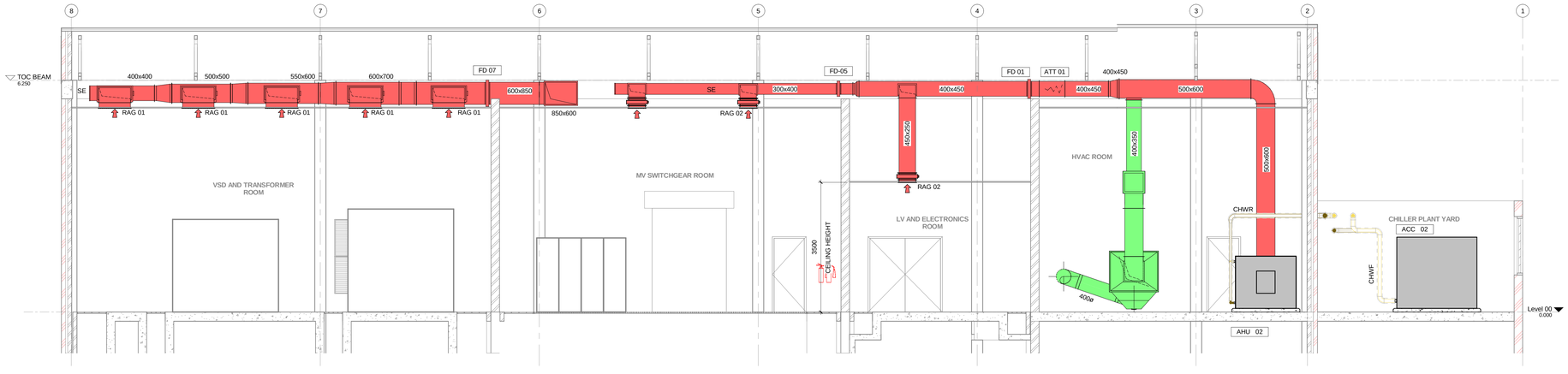


7 SECTION 7-7
0007 SCALE 1 : 50



8 SECTION 8-8
0007 SCALE 1 : 50



9 SECTION 9-9
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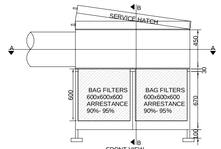

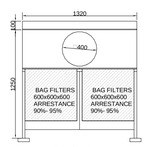

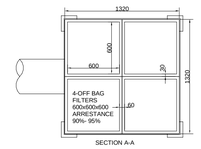

BAG FILTER BOX DETAIL
SCALE

HVAC PIPE LEGEND
- CHILLED WATER
- CHILLED WATER

HVAC LEGEND
- EXHAUST
- FRESH AIR/NATURAL
- RETURN
- SUPPLY
- FOUL
- MECHANICAL EQUIP/ AIR TERMINALS/ DUCT ACCESSORIES

MASTER
3 0 MAY 2018
AECOM TRANSNET

DRAWING	REFERENC
1924701-2-510-M-ST-0005	SUBSTATION M - STANDARD PIPING DETAILS
1924701-2-510-M-ST-0004	SUBSTATION M - STANDARD DUCTING DETAILS
1924701-2-510-M-GA-0029	SUBSTATION M - HVAC GENERAL ARRANGEMENT LAYOUT

REFERENCE DRAWINGS

GENERAL NOTES

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REVISIONS

NO	DESCRIPTIO	BY	CHK	APPD	DATE
00	ISSUED FOR CONSTRUCTION	AJ	JJ	AD	30-05-2018

CONTRACTOR/CONSULTANT			
TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE
DRAWN	A JULIUS		30 05 18
CHECKED	J JOOSTE		30 05 18
DESIGNED	J JOOSTE		30 05 18
CHECKED	A DALLY		30 05 18

PR.ENG./PR.TECH./PR.ARCH		
NAME	A.N. DALLY	DATE
SIGNATURE		30 05 18
REG. NUMBER	9170004	
SCALE:	AS SHOWN	A0

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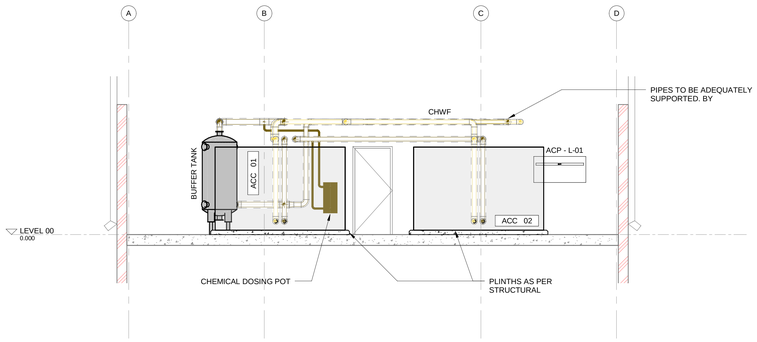
PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION M
HVAC SECTION LAYOUT

PROJECT NUMBER	OO	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	510	M	SE	0007	01	00	AE



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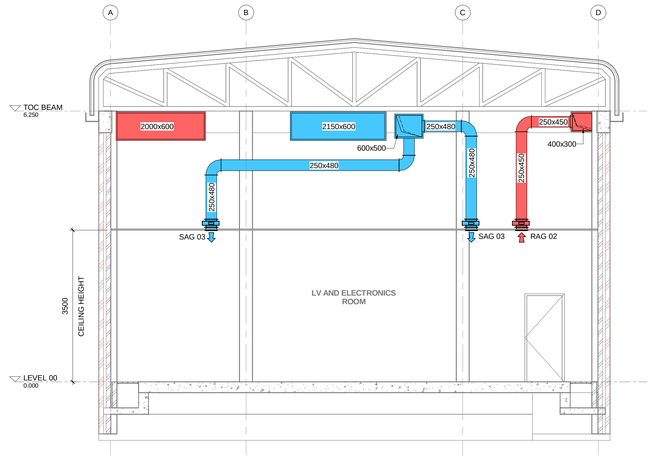

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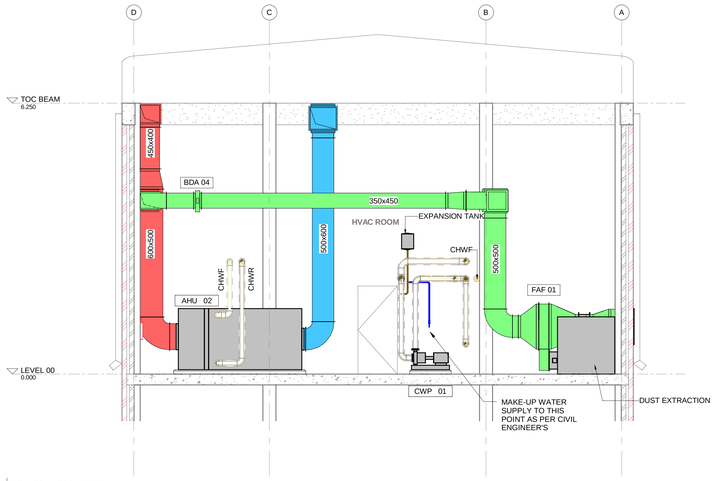

2 SECTION 2-2

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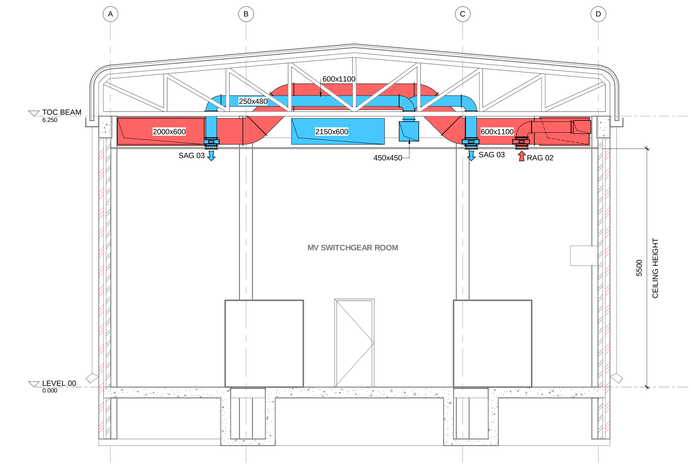
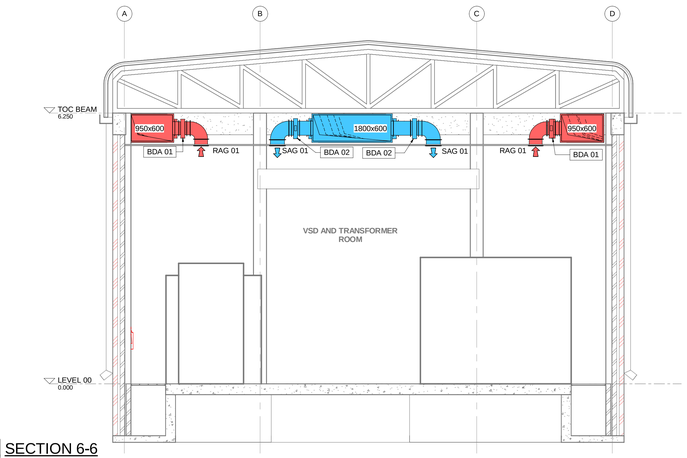


5 SECTION 5-5

0009 | SCALE 1 : 50

3 SECTION 3-3

0009 | SCALE 1 : 50



6 SECTION 6-6

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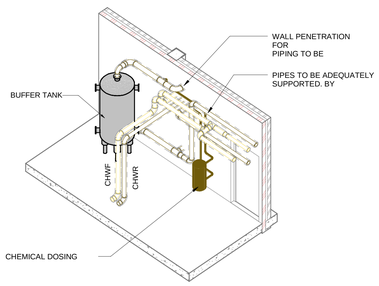
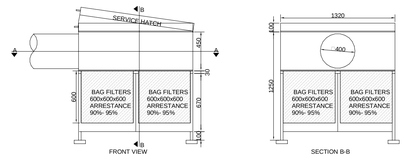
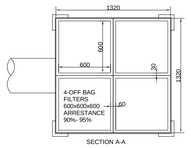


3D VIEW - BUFFER TANK SYSTEM

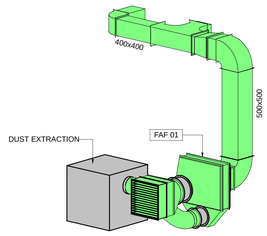
SCALE





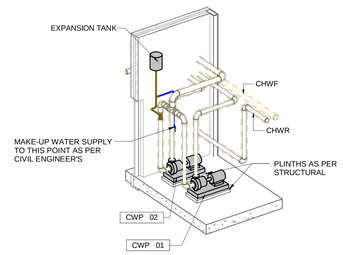
BAG FILTER BOX DETAIL

SCALE



3D VIEW - DUST EXTRACTION

SCALE



3D VIEW - CHILLED WATER PUMP SYSTEM

SCALE

HVAC LEGEND

- EXHAUST
- FRESH AIR/NATURAL
- RETURN
- SUPPLY
- FOUL
- MECHANICAL EQUIP/ AIR TERMINALS/ DUCT ACCESSORIES

HVAC PIPE LEGEND

- CHILLED WATER
- CHILLED WATER

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30 MAY 2018
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DRAWING	REFERENC
1924701-2-510-M-ST-0007	SUBSTATION N - STANDARD PIPING DETAILS
1924701-2-510-M-ST-0006	SUBSTATION N - STANDARD DUCTING DETAILS
1924701-2-510-M-SD-0007	SUBSTATION N - CHILLED WATER SCHEMATIC

REFERENCE DRAWINGS

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OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE
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CHECKED	J JOOSTE		30 05 18
DESIGNED	J JOOSTE		30 05 18
CHECKED	A DALLY		30 05 18

PR.ENG./PR.TECH./PR.ARCH		
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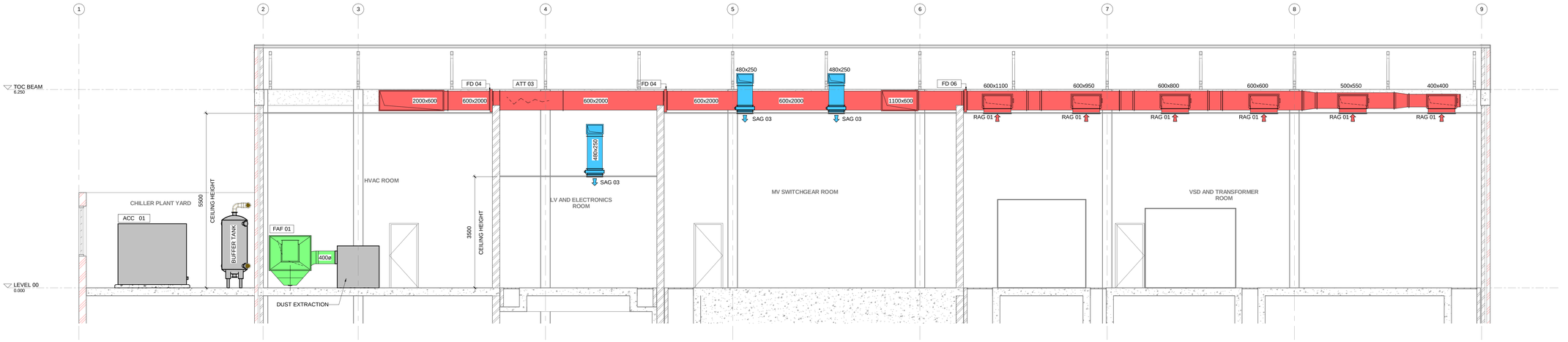
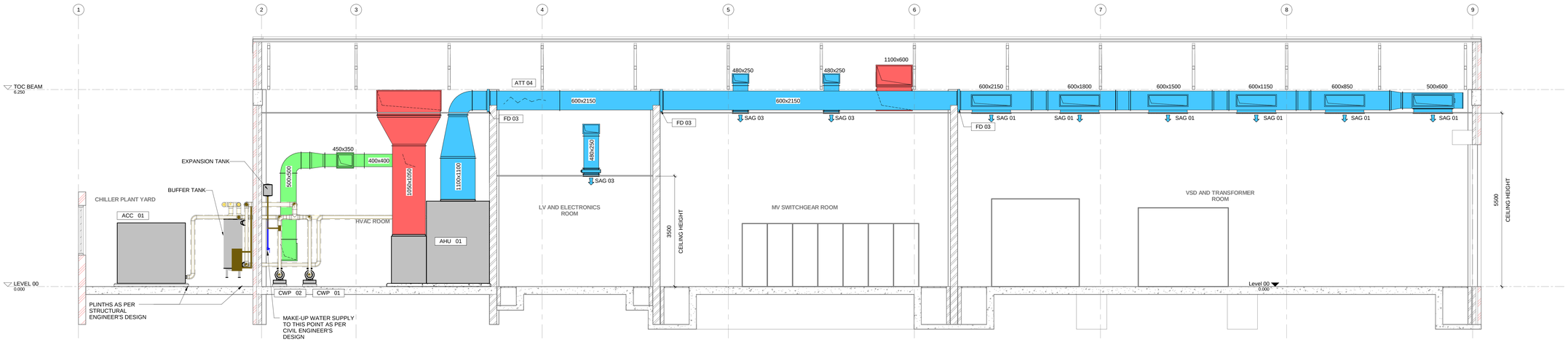
IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION N
HVAC GENERAL ARRANGEMENT SECTION LAYOUT

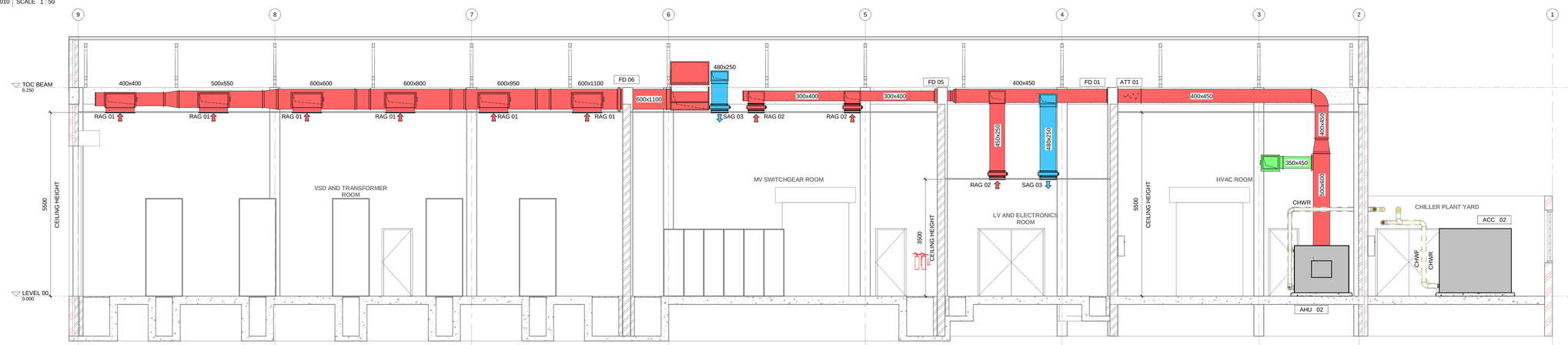
PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
A0 1924701	2	510	M	SE	0009	01	00	AE



1 SECTION 7-7
0010 SCALE 1 : 50



2 SECTION 8-8
0010 SCALE 1 : 50



3 SECTION 9-9
0010 SCALE 1 : 50

HVAC LEGEND

- EXHAUST
- FRESH AIR/NATURAL
- RETURN
- SUPPLY
- FOUL
- MECHANICAL EQUIP/ AIR TERMINALS/ DUCT ACCESSORIES

HVAC PIPE LEGEND

- CHILLED WATER
- CHILLED WATER

MASTER
30 MAY 2018
AECOM TRANSNET

1924701-2-510-M-ST-0007	SUBSTATION N - STANDARD PIPING DETAILS
1924701-2-510-M-ST-0006	SUBSTATION N - STANDARD DUCTING DETAILS
1924701-2-510-M-SD-0007	SUBSTATION N - CHILLED WATER SCHEMATIC
DRAWING	REFERENC

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BULK POWER UPGRADE:
SUBSTATION N
HVAC GENERAL ARRANGEMENT SECTION LAYOUT

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	510	M	SE	0010	01	00	AE

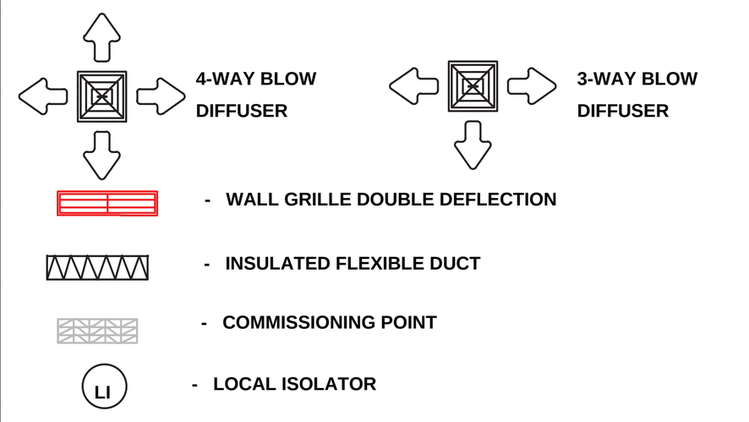
STANDARD DUCTING NOTES

THIS IS A GENERIC LEGEND AND NOT ALL ITEMS MAY BE APPLICABLE TO THIS SPECIFIC HVAC CONTRACT.

1. THE ENTIRE HVAC SYSTEM TO COMPLY WITH THE PROJECT TECHNICAL SPECIFICATION, WHICH THIS DRAWING FORMS PART OF.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED. SIZES SHOWN FOR THE DUCTS ARE CLEAR INTERNAL DIMENSIONS.
3. CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF ANY WORKS. ANY DISCREPANCY TO BE REPORTED TO THE EMPLOYER.
4. ALL HEATING, VENTILATION AND AIR CONDITIONING DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL PROJECT NOTES AND SPECIFICATIONS, AS ISSUED BY AECOM, AND RELEVANT ARCHITECTURAL, ELECTRICAL AND STRUCTURAL DRAWINGS
5. CAPACITIES, DIMENSIONS AND LOCATIONS OF HEATING, VENTILATION AND AIR CONDITIONING EQUIPMENT ARE BASED ON EQUIPMENT MODELS INDICATED IN HVAC EQUIPMENT CATALOGUES, SCHEDULES AND DRAWINGS.
6. ACCESS TO ALL HVAC EQUIPMENT AND ACCESSORIES SHALL BE AS PER DRAWINGS AND MANUFACTURERS' REQUIREMENTS.
7. ALL WATER PROOFING OF PENETRATIONS AND COUNTER FLASHINGS TO BE DONE BY SPECIALIST SUB-CONTRACTOR, TO BE APPOINTED BY CONTRACTOR.
8. STATIC PRESSURES FOR ALL THE FANS MUST BE VERIFIED PRIOR TO ORDERING THE FANS.
9. ALL THE TOILET DOORS TO BE UNDERCUT 25mm, OR PROVIDED WITH DOOR GRILLES.
10. ALL MATERIALS EXPOSED TO THE AIRFLOW WITHIN THE CEILING CAVITY PLENUM SHALL BE NON-COMBUSTIBLE OR LIMITED COMBUSTIBLE, WITH A MAXIMUM SMOKE DEVELOPMENT INDEX OF 50.
11. FINAL LOCATIONS & DIMENSIONS OF CONCRETE UPSTANDS FOR THE HVAC EQUIPMENT AND HVAC PIPING SHALL BE CHECKED ON SITE TO SUIT HVAC EQUIPMENT SPECIFIED.
12. ALL THE EXTERNAL SUPPORT BRACKETS, SHALL BE HOT DIP GALVANISED BEFORE INSTALLATION.
13. WHERE DUCTS AND PIPES PASS THROUGH WALLS, SLEEVES SHALL BE PROVIDED, AND SEALED WITH AN APPROPRIATE FIRE RATED SEALANT TO PROVIDE AN AIR-TIGHT INSTALLATION.
14. ALL EQUIPMENT DUTIES ARE GIVEN AS RATED DESIGN DUTIES WITH AIR VOLUMES CORRECTED FOR SITE ELEVATION ABOVE SEA LEVEL.
15. DIRECTION ARROWS AND IDENTIFICATION BANDS ARE TO BE PLACED EVERY TWO METER INTERVALS OVER THE INSULATION FOR ALL SERVICES.
16. ALL BENDS / ELBOWS WHICH HAVE A THROAT RADIUS LESS THAN 3/4 OF THE HEEL RADIUS MUST BE VANED. REFER TO CHART BELOW.
17. ALL AIR DIFFUSION EQUIPMENT SHALL BE SELECTED AND INSTALLED AS PER THE SUPPLIERS' DETAILED SPECIFICATIONS, AND ALL BRANCH DUCTS / CONNECTIONS TO AIR DIFFUSERS TO BE FITTED WITH DUCT BALANCING DAMPERS, AS SHOWN ON DRAWINGS.
18. ALL AIR CONDITIONING DUCTWORK TO BE LAGGED WITH RIGID FIBERGLASS SLAB COVERED WITH REINFORCED ALUMINIUM FOIL, AND FINISHED WITH A VAPOUR SEAL BARRIER:
    - 25mm THICK FIBERGLASS FOR INTERNAL DUCTWORK @ 24 kg/m³
    - 50mm THICK FIBERGLASS FOR EXTERNAL DUCTWORK @ 32 kg/m³, AND FINISHED WITH A WATER PROOF BARRIER.
    - HARD INSULATION UNDER SUPPORTS. (REFER DETAIL-10)
19. ALL THE SUPPLY SLOT DIFFUSERS & RETURN SLOT DIFFUSERS SHALL BE SIMILAR TO TROX TYPE - ALS OR APPROVED EQUIVALENT.
20. FINAL LOCATION OF ALL AIR DIFFUSION EQUIPMENT SHALL BE CO-ORDINATED WITH THE CEILING TILES, LIGHTING FIXTURES AND OTHER CEILING FIXTURES ON SITE.
21. FLEXIBLE DUCT TO ANY AIR OUTLET SHALL NOT EXCEED A LENGTH OF 1500mm, AND SHOULD BE STRAIGHT TO ACHIEVE MINIMUM AIR RESISTANCE AND NOISE.
22. ALL OUTSIDE AIR INTAKE OPENINGS SHALL BE PROVIDED WITH FILTERS UNLESS OTHERWISE NOTED ON THE HVAC DRAWINGS. OPENINGS TO BE MINIMUM 500mm ABOVE ROOF / GROUND LEVEL.
23. ALL DUCTWORK WORK RUNNING THROUGH HIGH HUMIDITY AREAS SHALL BE WRAPPED WITH 25mm THICK 32kg / m³ DENSITY FIBERGLASS INSULATION.
24. ALL THE OUTLETS FOR SUPPLY, RETURN, TRANSFER & EXHAUST AIR SHALL BE PROVIDED WITH VOLUME CONTROL DAMPERS. ALL DUCT CONNECTIONS FROM MAIN DUCTS TO BE PROVIDED WITH SPLITTER TYPE DAMPERS, OR AS OTHERWISE NOTED ON THE DRAWINGS.
25. ALL TRANSFER DUCTS SHALL BE PROVIDED WITH BACK DRAFT DAMPERS, IN ORDER TO PREVENT AIR FLOW IN THE OPPOSITE DIRECTION.
26. ALL AIR DIFFUSION EQUIPMENT SHALL BE EPOXY MATT WHITE, UNLESS SPECIFIED OTHERWISE.
27. FINAL SIZE OF ALL THE WEATHER LOUVRES DEPEND ON THE FAN SPECIFIED.
28. BACKDRAFT DAMPERS SHALL BE SIMILAR TO TROX TYPE - ARK OR APPROVED EQUIVALENT.
29. DUCTWORK AS NOTED IN MATERIAL SCHEDULE SHALL BE FABRICATED, CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH THE SMACNA STANDARD. THIS WILL INCLUDE PROVISION FOR ALL TEST POINTS TO ENABLE AIR BALANCING AND COMMISSIONING ACTIVITIES TO BE PERFORMED. (REFER TO DETAIL BELOW)
30. HINGED ACCESS DOORS SHALL BE PROVIDED ON THE LINK SIDE OF ALL FIRE DAMPERS AND CONTROL DAMPERS, AND GENERALLY AS RECOMMENDED BY THE SMACNA STANDARD.
31. FILTER SPECIFICATION
    PRIMARY AIR FILTER MATERIAL SHALL BE CAPABLE OF BEING WASHED AT LEAST 12 TIMES, AND HAVE AVERAGE ARRESTANCE OF 80% ACCORDING TO THE ASHRAE 52 / 76 STANDARD.
    SPARE FILTERS SHALL BE PROVIDED.
    FILTERS TO BE HOUSED IN PURPOSE-MADE FILTER HOUSINGS WITH AIRTIGHT ACCESS DOORS.
32. KITCHEN HOOD AND DUCT DETAILS
    a. THE HOOD SHALL BE CONSTRUCTED FROM AND BE SUPPORTED BY STAINLESS STEEL TYPE 430 NOT LESS THAN 1.2mm (OR) OF OTHER APPROVED MATERIAL OF EQUIVALENT STRENGTH, FIRE AND CORROSION RESISTANCE
    b. DUCTS SHALL BE CONSTRUCTED OF AND SUPPORTED BY CARBON STEEL NOT LESS THAN 1.37mm (16#) (OR) STAINLESS STEEL NOT LESS THAN 1.2mm (18#)
    c. ALL BEAMS AND JOINTS SHALL HAVE LIQUID-TIGHT CONTINUOUS EXTERNAL WELDS
    d. FIRE SUPPRESSION SYSTEM TO BE DONE BY SPECIALIST SUB-CONTRACTOR, TO BE APPOINTED BY CONTRACTOR.
    e. FIRE WALL SHALL BE 2-HOUR RATED TO ENCLOSE EXHAUST DUCT.
    f. FILTERS MUST BE "UL" CLASSIFIED, STAINLESS STEEL, NON-CLOGGING BAFFLE-TYPE, AND SHOULD BE EASILY REMOVABLE
    g. A RESIDUE TRAP SHALL BE PROVIDED AT THE BASE OF EACH VERTICAL RISER, WITH PROVISIONS FOR CLEANOUT
    h. AN OPENING, LARGE ENOUGH TO PERMIT CLEANING, SHALL BE PROVIDED AT EACH CHANGE IN DIRECTION OF THE DUCT, FOR THE PURPOSES OF INSPECTION AND CLEANING. SUCH OPENING SHALL BE AT THE SIDES OF THE DUCT AND AT EVERY TWO METER IN HORIZONTAL DUCTWORK.
    i. AFTER INSTALLATION OF FILTERS, THE REMAINING AREA OF THE HOOD TO BE CLOSED OFF
    J. KITCHEN EXHAUST DUCTS SHALL BE CONSTRUCTED IN COMPLIANCE WITH NFPA STANDARDS
33. MAIN HVAC ELECTRICAL POWER SUPPLY CABLE TO BE COPPER.
34. ALL HEATER BANKS TO BE HOUSED IN FLANGED STEEL CASINGS FOR EASY REMOVAL AND COMPLY WITH THE FOLLOWING SAFETY REQUIREMENTS:
    - AIR PRESSURE SWITCH / SAIL SWITCH
    - OVERHEAT THERMOSTAT WITH MANUAL RESET
    - BACK OF TERMINAL BOX TO BE INSULATED
    - ACCESS DOOR INTERLOCKED WITH HEATER BANK
    - HEATER ELEMENTS TO BE SIZED TO SUIT NUMBER OF STEPS AND BALANCE POWER OVER THE THREE PHASES
    - PROPORTIONAL OUTPUT CONTROL TO BE PROVIDED
    - HEATER ELEMENTS TO BE INCOLOY TYPE OR APPROVED EQUIVALENT & CHOSEN FOR "BLACK HEAT" OPERATION. (HEATING INTENSITY NOT MORE THAN 3 WATTS)
    - INSULATION SHALL BE 6mm THICK NON ASBESTOS MILL BOARD, LOCATED 300mm UPSTREAM AND 600mm DOWNSTREAM
35. ALL MACHINES AND MOTORS (ABOVE 0.75 kW) SHALL INCORPORATE THE FOLLOWING:-
    a. HIGH EFFICIENCY MOTORS (LOW COPPER AND IRON LOSSES)
    b. POWER FACTOR CORRECTION TO 0.95
    c. SPEED CONTROLLERS WITH VARIABLE / AUTOMATIC CONTROL VIA. BMS WITH 4 - 20 mA CONTROL (IF REQUESTED)
    d. ALL CONTROL TRANSFORMERS SHALL BE HIGH EFFICIENCY (LOW COPPER AND IRON LOSSES)
36. MOTOR POWER FOR ALL THE HVAC EQUIPMENT SHALL BE VERIFIED ONCE ORDERED
37. SOUND ATTENUATION
    a. ALL FACTORY-MADE SOUND ATTENUATORS TO BE SELECTED AND LOCATED AS PER THE "HOWDEN-DONKIN" COMPANY REQUIREMENTS.
    b. ALL SOUND ATTENUATORS TO BE LINED WITH MELINEX FILM, OR APPROVED EQUIVALENT.
    c. TRANSITION DUCTWORK BETWEEN ATTENUATORS AND AIR-CON UNITS TO BE PROVIDED WITH ACOUSTIC INSULATION AS PER DETAIL 11 ON THIS DRAWING.
    d. ALL DUCT LINING MATERIAL SHALL COMPLY WITH SABS STANDARDS.
    e. OCCUPIED ROOMS SHALL ATTAIN THE SOUND LEVELS AS NOTED IN THE ASHRAE APPLICATIONS HANDBOOK, CHAPTER - "SOUND AND VIBRATION CONTROL".
38. VIBRATION ISOLATION OF EQUIPMENT
    ALL ROTATIONAL EQUIPMENT WHICH HAS A POWER CONSUMPTION IN EXCESS OF 1kW SHALL BE FITTED WITH VIBRATION ISOLATORS TO ENSURE NO EQUIPMENT VIBRATION IS TRANSMITTED INTO THE STRUCTURE. VIBRATION ISOLATORS SHALL BE SELECTED IN ACCORDANCE WITH THE MASON INDUSTRIES SELECTION DATA CONSIDERING A MINIMUM 0F 5% TRANSMISSION OF VIBRATION.
39. FOR ALL THE HVAC EQUIPMENT, A CONDENSATE DRAIN SHOULD BE PROVIDED WITHIN TWO METERS OF THE UNIT, BY OTHERS, UNLESS STATED OTHERWISE.

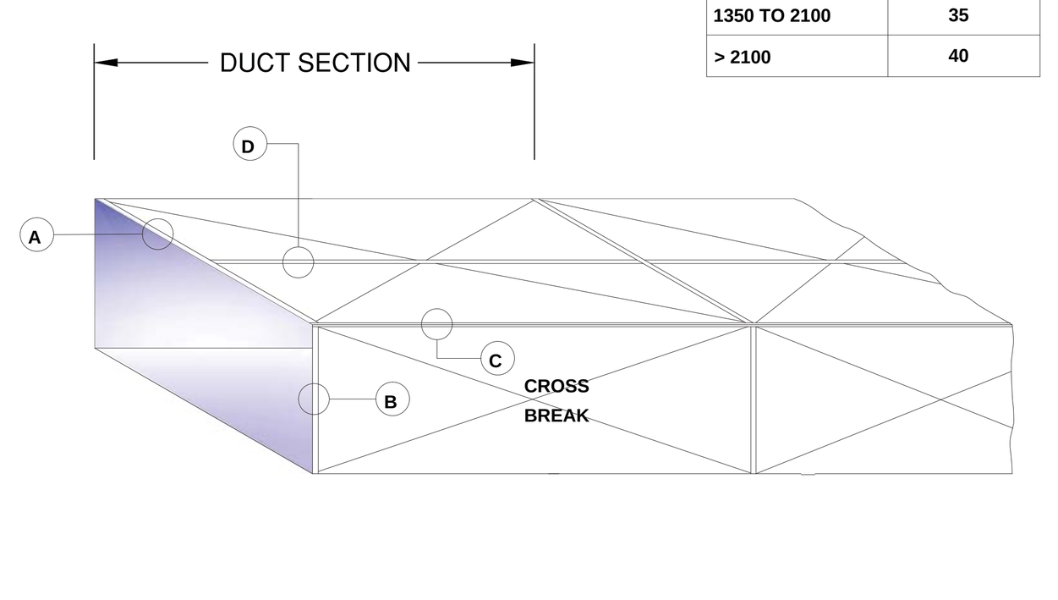
LEGEND

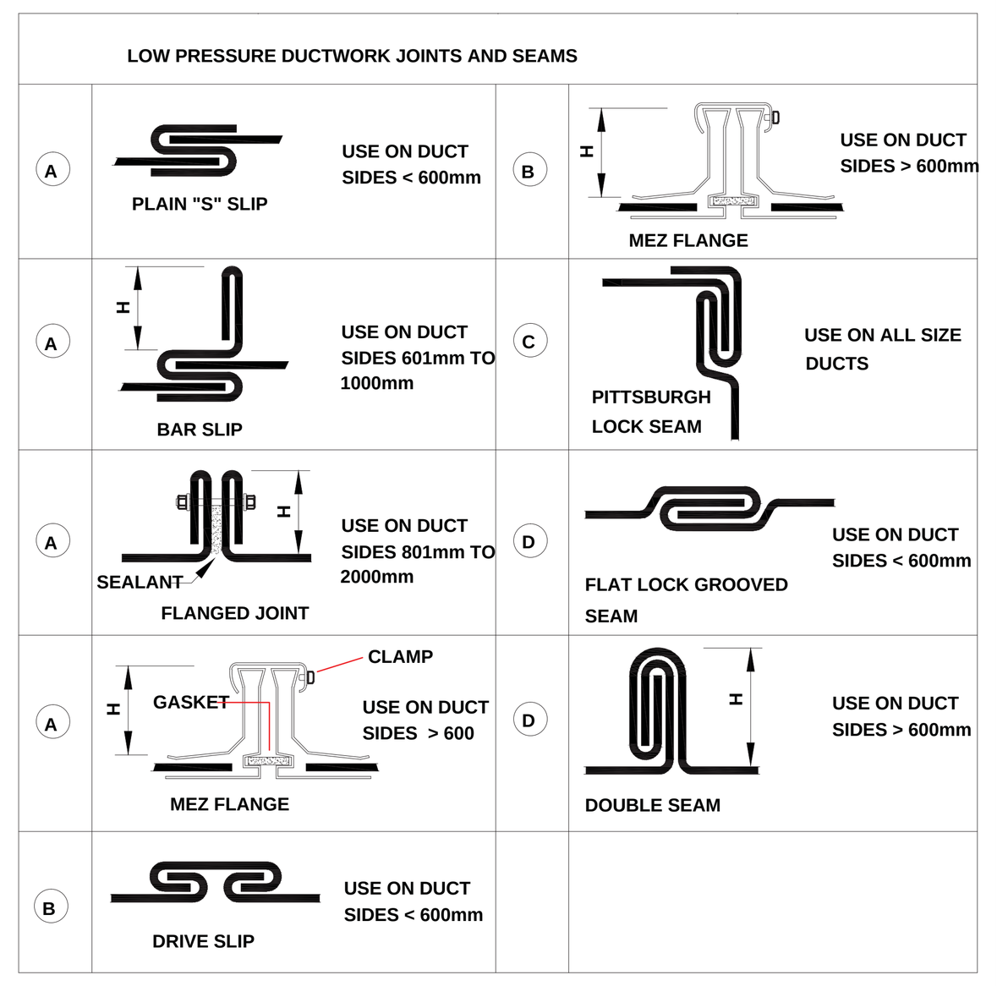
(T)	THERMOSTAT
°C	DEGREE CENTIGRADE
l/s	LITRES PER SECOND
DAC	DOOR AIR CURTAIN
db	DRY BULB
EAD	EXHAUST AIR DUCT
E/A	EXHAUST AIR
EDH	ELECTRIC DUCT HEATER
EG	EXHAUST AIR GRILLE
ESP.	EXTERNAL STATIC PRESSURE
EF	EXHAUST FAN
FAD	FRESH AIR DUCT
FCU	FAN COIL UNIT
Pa	PASCAL
kW	KILO WATT
QTY.	QUANTITY
R/A	RETURN AIR
RAG	RETURN AIR GRILLE
RLG	RETURN LINEAR GRILLE
RWG	RETURN WALL GRILLE
S/A	SUPPLY AIR
SAF	SUPPLY FAN
SCG	SUPPLY CEILING GRILLE
SCD	SUPPLY CEILING DIFFUSER
S.S	STAINLESS STEEL
SWG	SUPPLY WALL GRILLE
T/A	TRANSFER AIR
TAG	TRANSFER AIR GRILLE
TAD	TRANSFER AIR DUCT
TEMP	TEMPERATURE
UC OR ●	UNDER CUT (25mm) MIN.
wb	WET BULB
W.O	WALL OPENING
F.D	FIRE DAMPER (? HOUR RATING)
F.S.D	FIRE/SMOKE DAMPER (? HOUR RATING)



UPSTAND SEAM DIMENSION TABLE

LONGER DUCT DIMENSION (mm)	"H" (mm)
< 750	25
750 TO 1350	25
1350 TO 2100	35
> 2100	40

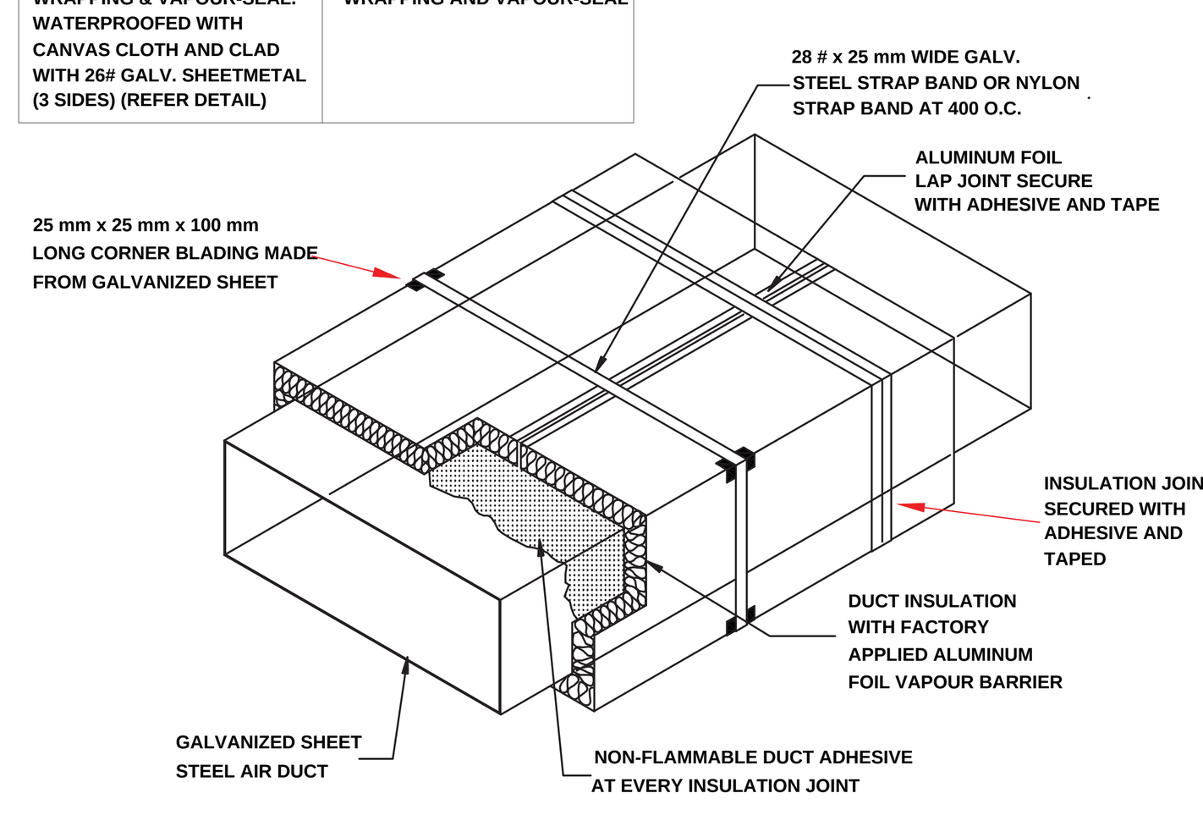




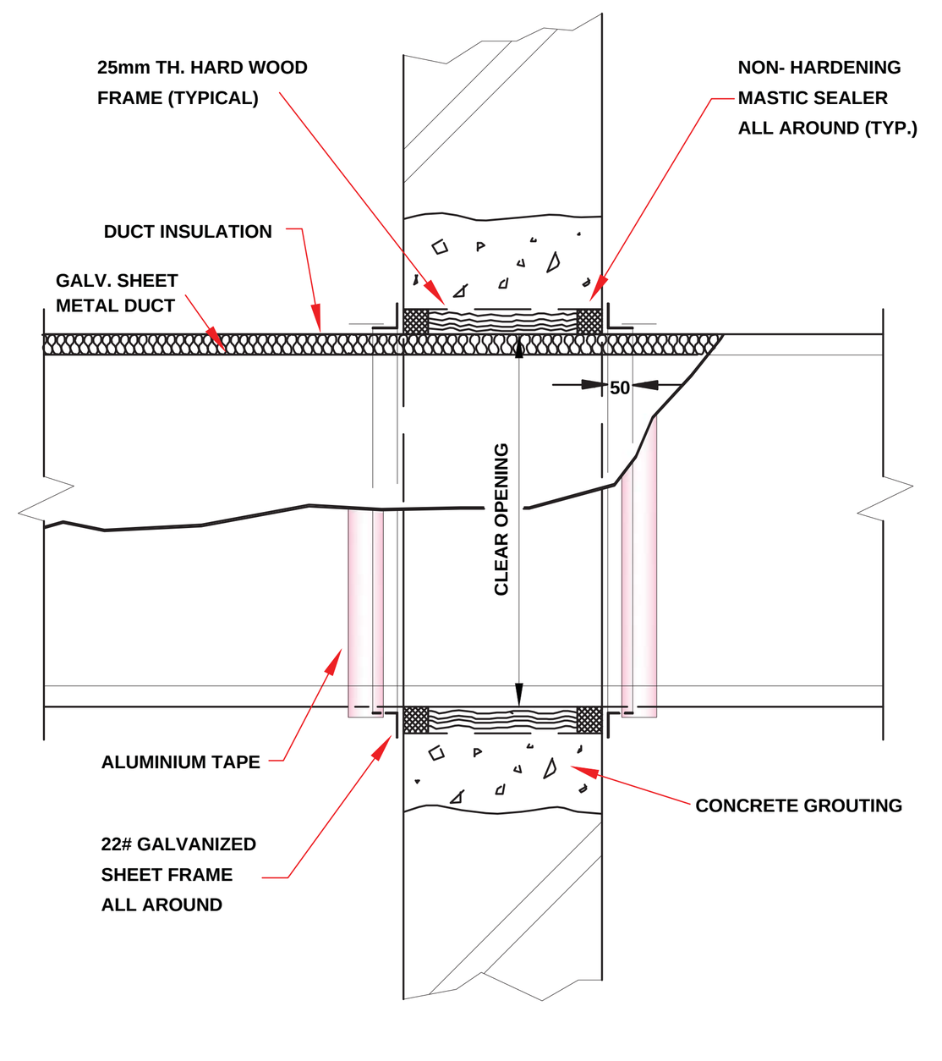
1 **EXAMPLES OF LOW PRESSURE DUCT JOINTS & SEAMS**
N.T.S
REFER TO SANS 1238 (LATEST EDITION) FOR FURTHER DETAILS OF LOW, MEDIUM & HIGH PRESSURE DUCTS

INSULATION NOTES

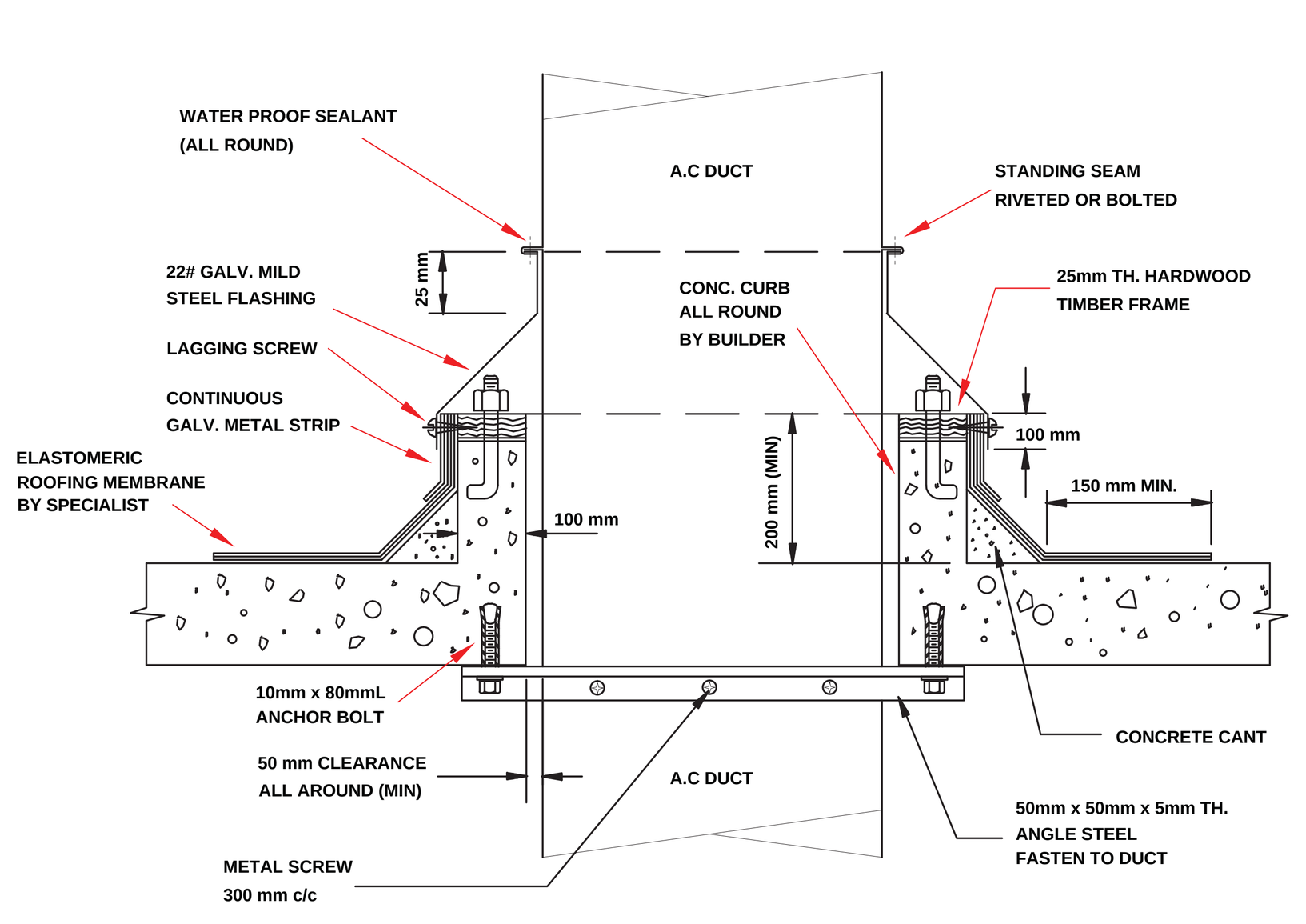
EXTERNAL DUCTS	INTERNAL DUCTS
50mm THICK FIBREGLASS DENSITY: 32kg/m³ WITH ALUMINIUM FOIL-FACED WRAPPING & VAPOUR-SEAL. WATERPROOFED WITH CANVAS CLOTH AND CLAD WITH 26# GALV. SHEETMETAL (3 SIDES) (REFER DETAIL)	25mm THICK FIBREGLASS DENSITY: 24kg/m³ WITH ALUMINIUM FOIL-FACED WRAPPING AND VAPOUR-SEAL



2 **RECTANGULAR DUCT INSULATION DETAIL**
N.T.S

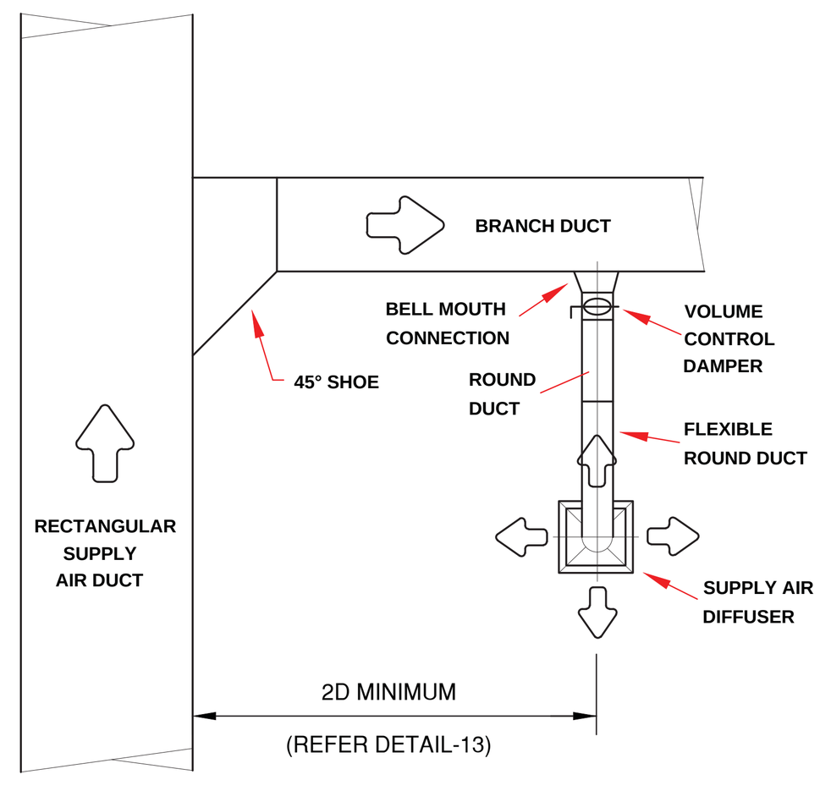


3 **DUCT THRU WALL DETAILS**
N.T.S

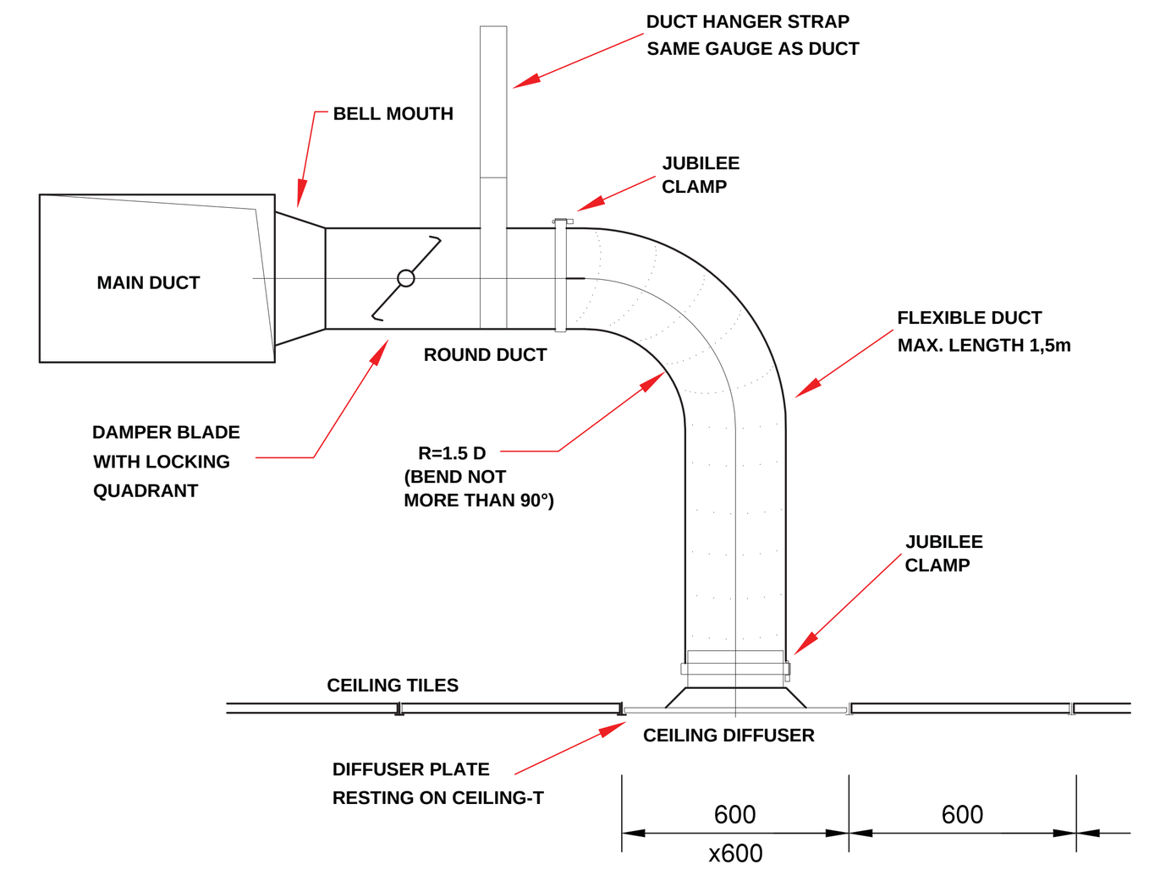


NOTE:
FLASHING AND SUPPORT MATERIAL TO BE COMPATIBLE WITH DUCT WORK MATERIAL

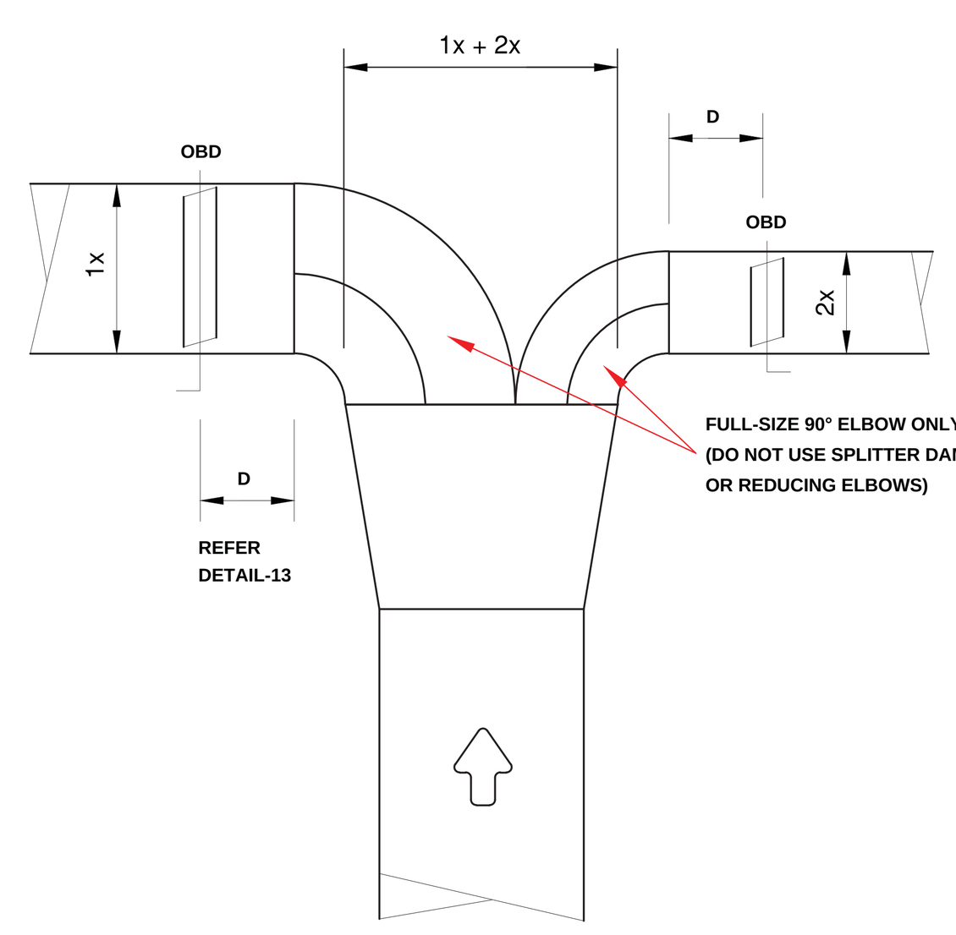
4 **DUCT THRU ROOF DETAILS**
N.T.S



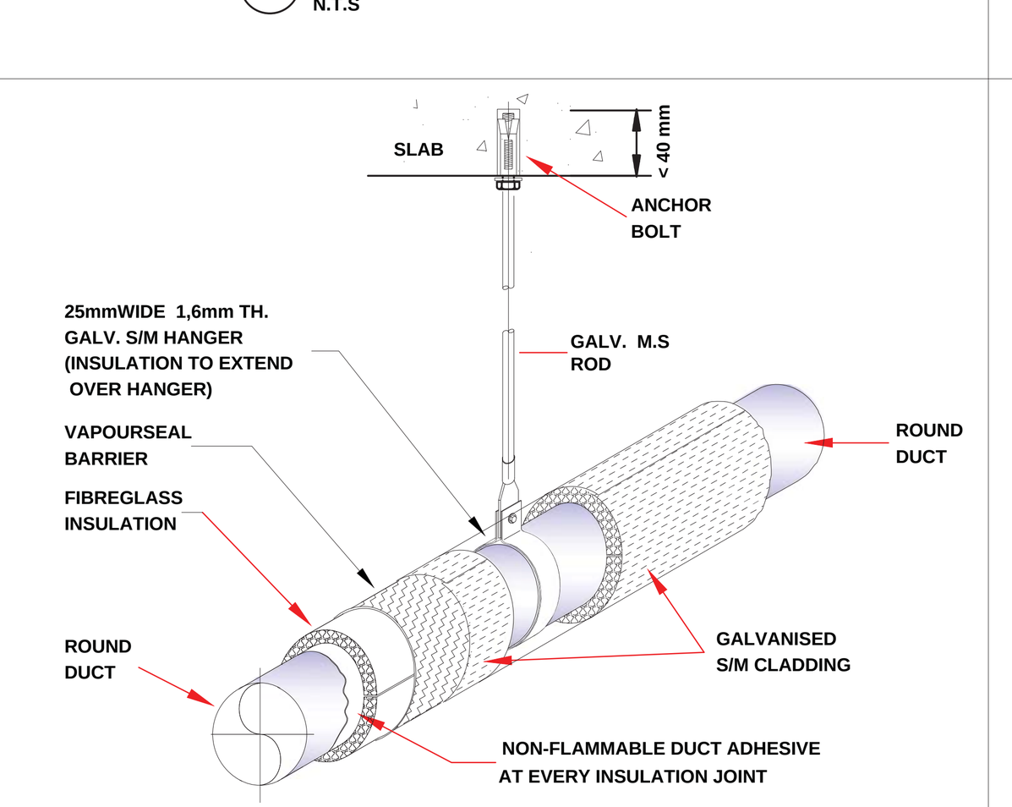
5 **TYPICAL BRANCH CONNECTION DETAIL**
NTS



6 **FLEXIBLE DUCT INSTALLATION**
N.T.S



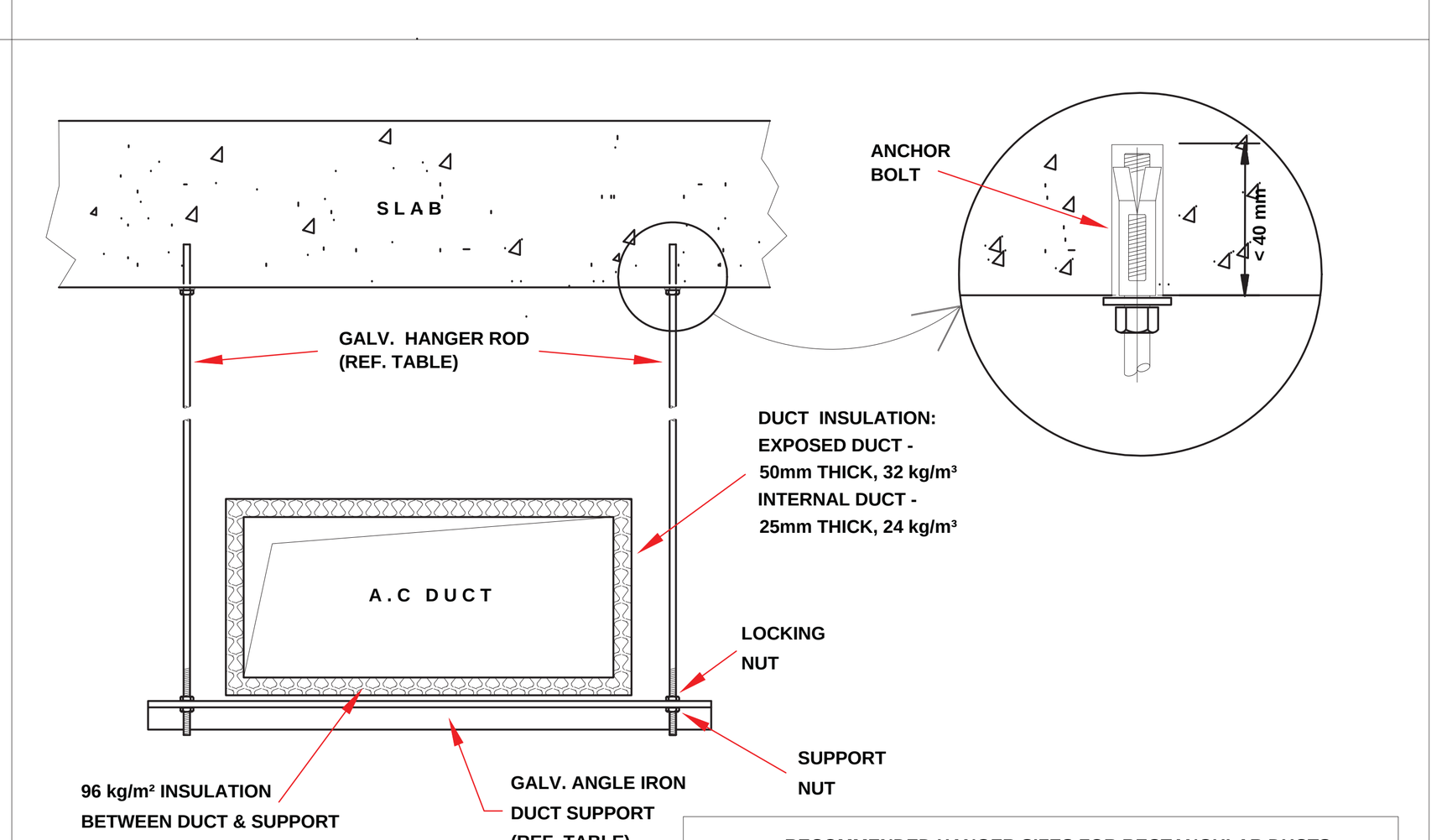
7 TYP. DUCT SPLITTING / BRANCH CONNECTION
N.T.S



MINIMUM HANGER SIZES FOR ROUND DUCT

DUCT Ø (mm)	HANGER INTERVAL (mm)	HANGER ROD Ø (mm)
250	3000	6
450	3000	6
600	3000	6
900	3000	10
1250	2400	10
1500	2400	10
2100	2400	10

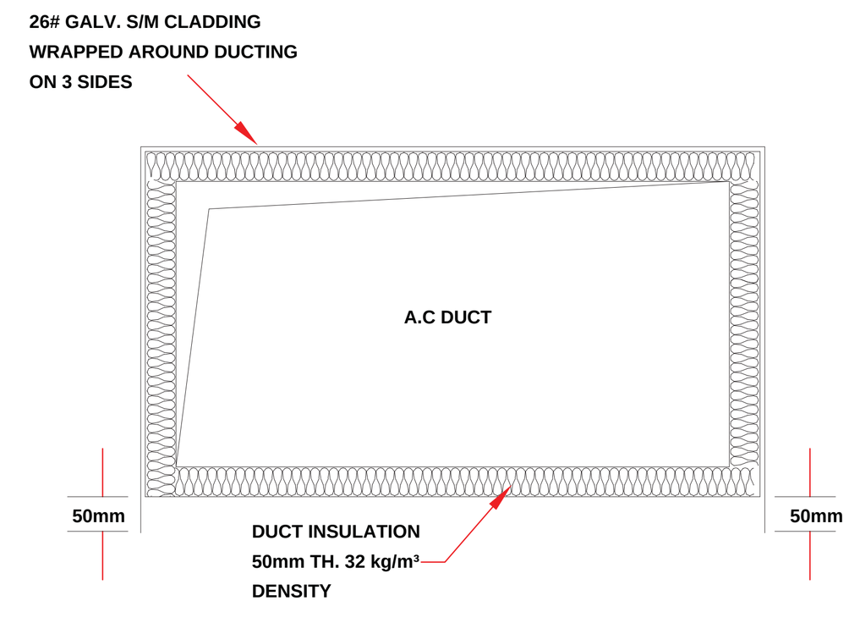
8 **EXPOSED ROUND DUCT SUPPORT AND INSULATION**
N.T.S



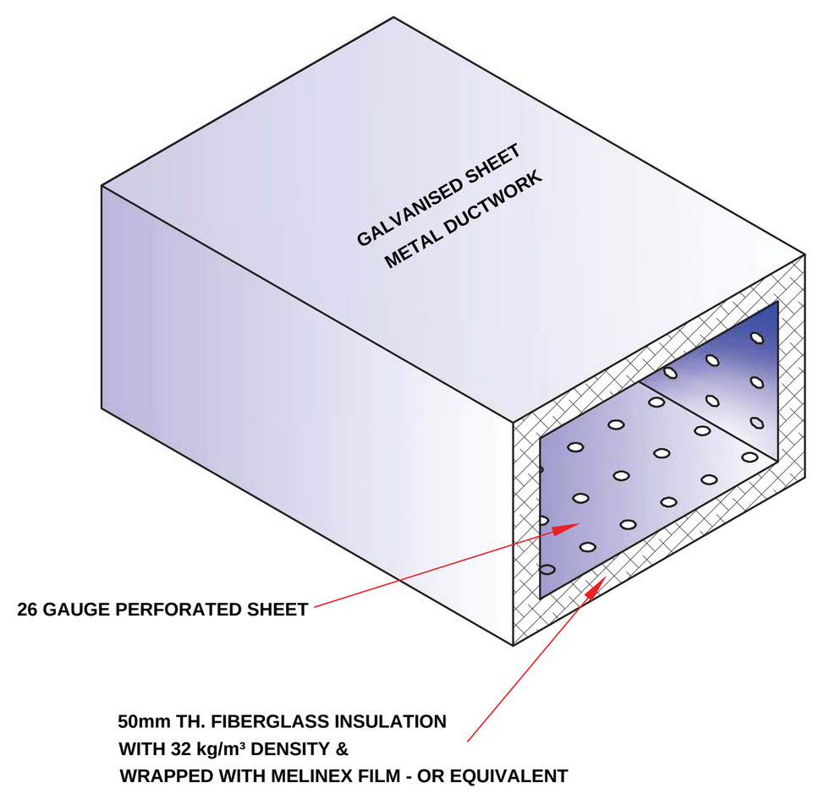
RECOMMENDED HANGER SIZES FOR RECTANGULAR DUCTS

LONGER DUCT DIMENSION (mm)	ANGLE IRON (SUPPORT)	HANGER ROD (mm)	GALV. STRAP HANGER (mm)	MAX. SPACING (mm)
UP TO 760	25x25x3	Ø6mm	25 x 1,6	3000
761 TO 1000	38x38x3	Ø6mm	25 x 1,6	3000
1001 TO 1200	50x50x3	Ø10mm	25 x 1,6	2400
2101 TO 2400	50x50x6	Ø10mm	25 x 1,6	2400
2401 AND OVER	50x50x6	Ø12mm	25 x 1,6	2400

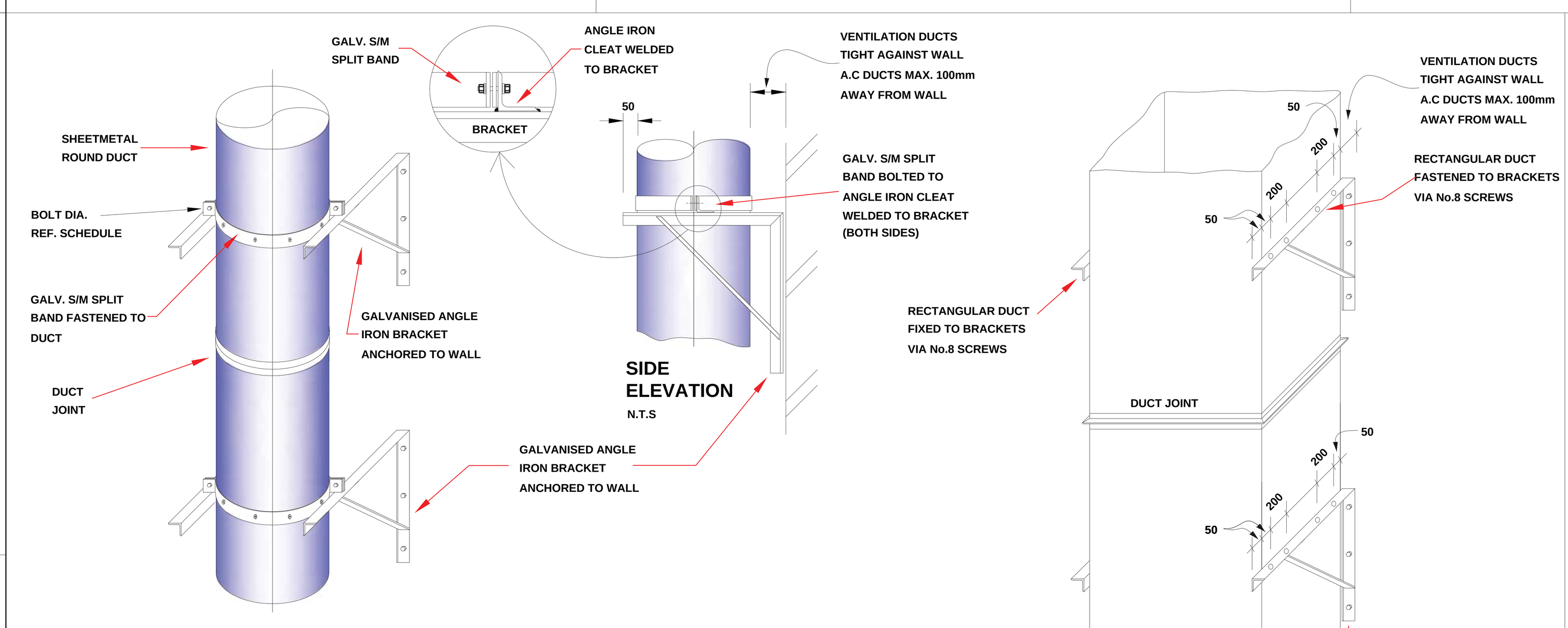
9 **RECTANGULAR HORIZONTAL DUCT SUPPORT**
N. T. S



10 **EXPOSED DUCT CLADDING DETAIL**
N.T.S



11 **ACOUSTIC INSULATION OF DUCTWORK**
N.T.S



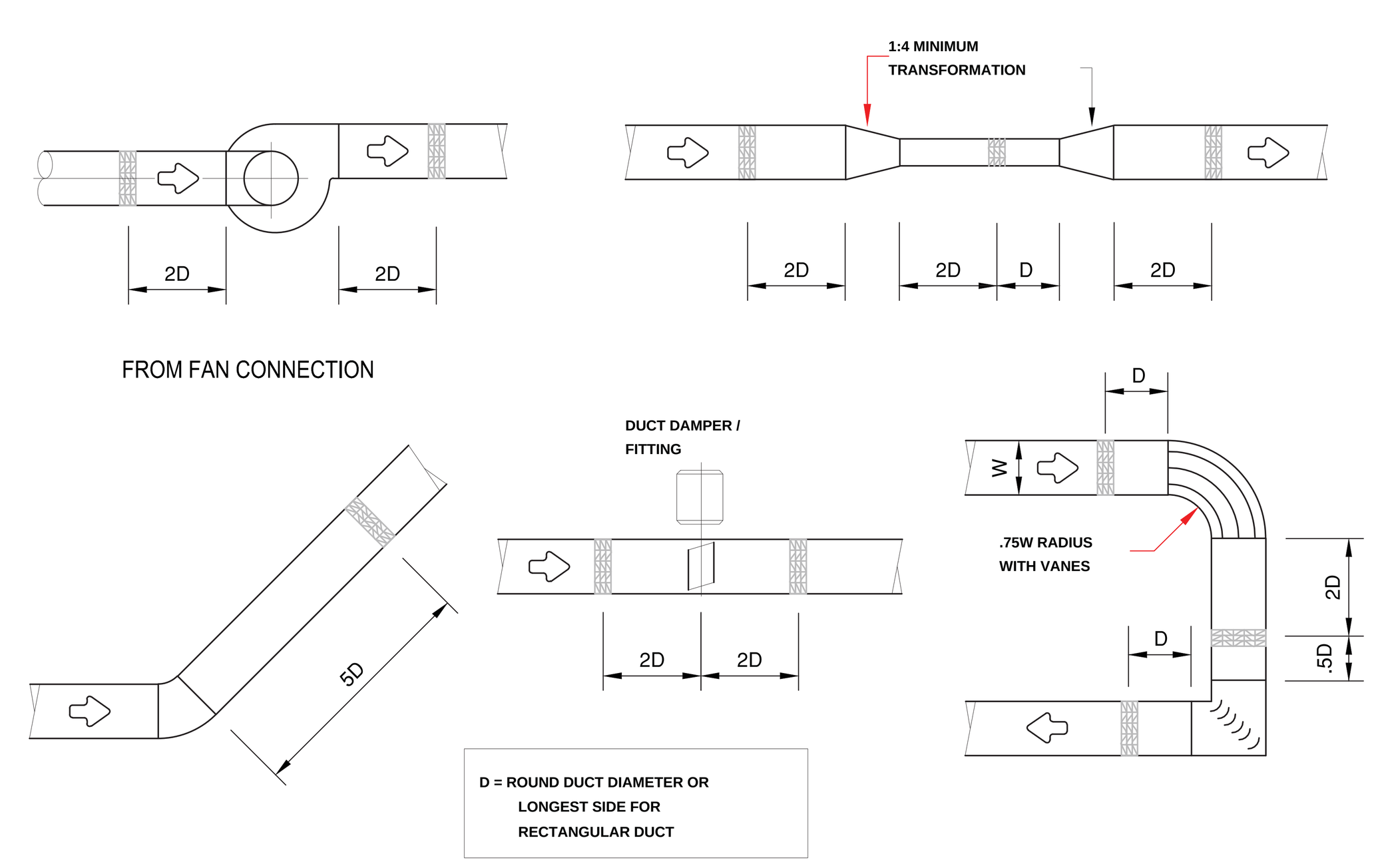
ANGLE IRON BRACKET SIZING

RECTANG. DUCT PERIMETER	Ø DUCT	ANGLE IRON (BRACKET)
1050 mm	< 680	25x25x3
1350 mm	680 TO 875	25x25x3
1650 mm	875 TO 1050	32x32x3
2150 mm	1050 TO 1250	32x32x3

SPLIT BAND SIZING

Ø DUCT	GALV. S/M BAND WIDTH	Ø BOLT
< 305	25mm (16#)	6mm
305 TO 600	25mm (16#)	6mm
600 TO 950	51mm (16#)	10mm
950 TO 1550	51mm (16#)	10mm

12 **DETAIL OF DUCT RISER SUPPORT OFF WALL**
N.T.S



D = ROUND DUCT DIAMETER OR LONGEST SIDE FOR RECTANGULAR DUCT

13 **AIR FLOW DUCT TRAVERSE READING POINTS**
N.T.S

DUCTWORK MATERIAL SCHEDULE

AIR SYSTEM	MATERIAL
LOW PRESSURE SUPPLY	MILD STEEL GALVANIZED NOT LESS THAN 24#
RETURN	MILD STEEL GALVANIZED
GENERAL EXHAUST DUCT SYSTEM	MILD STEEL GALVANIZED
KITCHEN EXHAUST SYSTEM	CARBON STEEL (16# MIN.)
LAB EXHAUST SYSTEM	STAINLESS STEEL 316 (22# MIN.)
VAPOUR LADEN EXHAUST	ALUMINIUM (MIN 1.27mm) OR STAINLESS STEEL 316 (22# MIN.)
OUTSIDE AIR INTAKE/SUPPLY	MILD STEEL GALVANIZED

NOTES
THE CONTRACTOR SHALL APPLY S.M.A.C.N.A TABLE 1-5 FOR 500 Pa STATIC PRESSURE, OR LESS.
THE CONTRACTOR SHALL PROVIDE REINFORCEMENT IN ACCORDANCE WITH SELECTED GAUGES SHOWN.

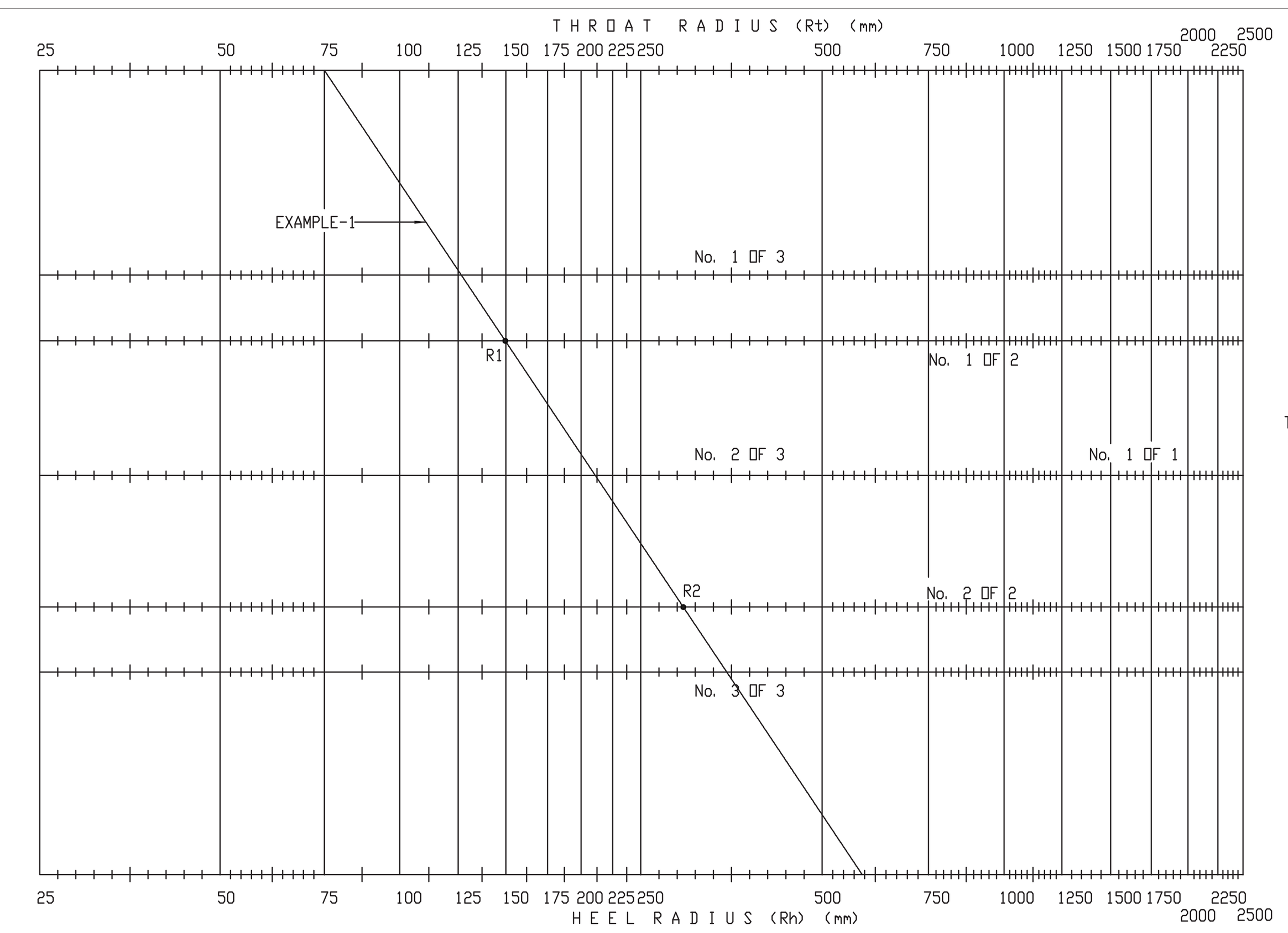
DUCTWORK PRESSURE CLASS SCHEDULE

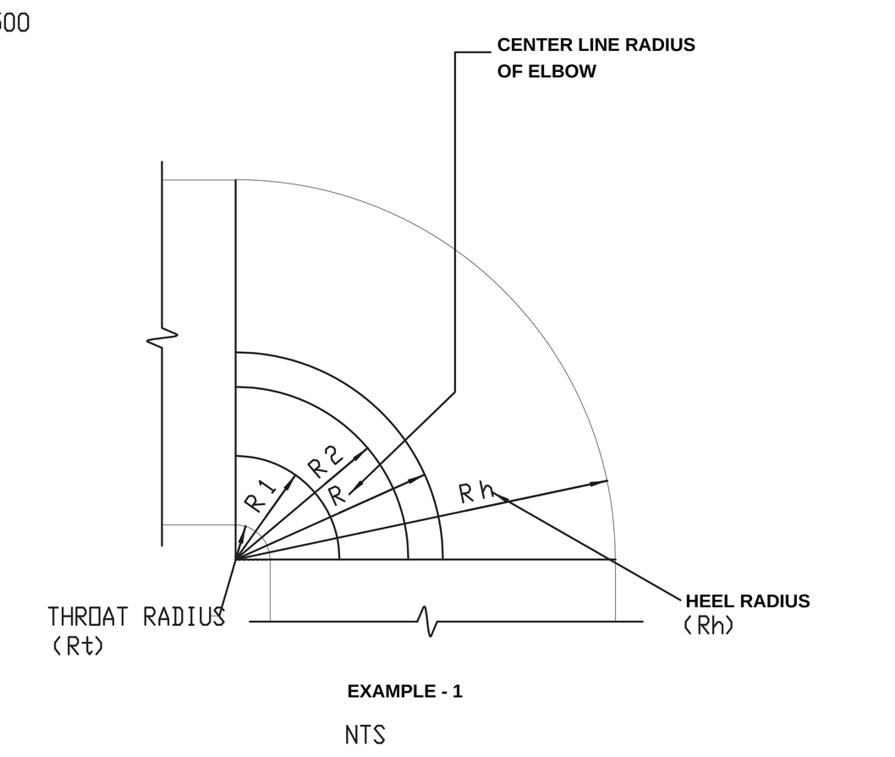
AIR SYSTEM	PRESSURE CLASS
AIR SUPPLY SYSTEM (FCU)	250 Pa
AIR SUPPLY SYSTEM (AHU)	500 TO 750 Pa
RETURN	250 Pa
RETURN AND RELIEF	250 Pa
KITCHEN EXHAUST	750 Pa
LAB EXHAUST	250 Pa
GENERAL EXHAUST	500 Pa
OUTSIDE AIR INTAKE/SUPPLY	500 Pa

STANDARD CONSTRUCTION FOR RECTANGULAR LOW PRESSURE DUCTS (500 Pa)

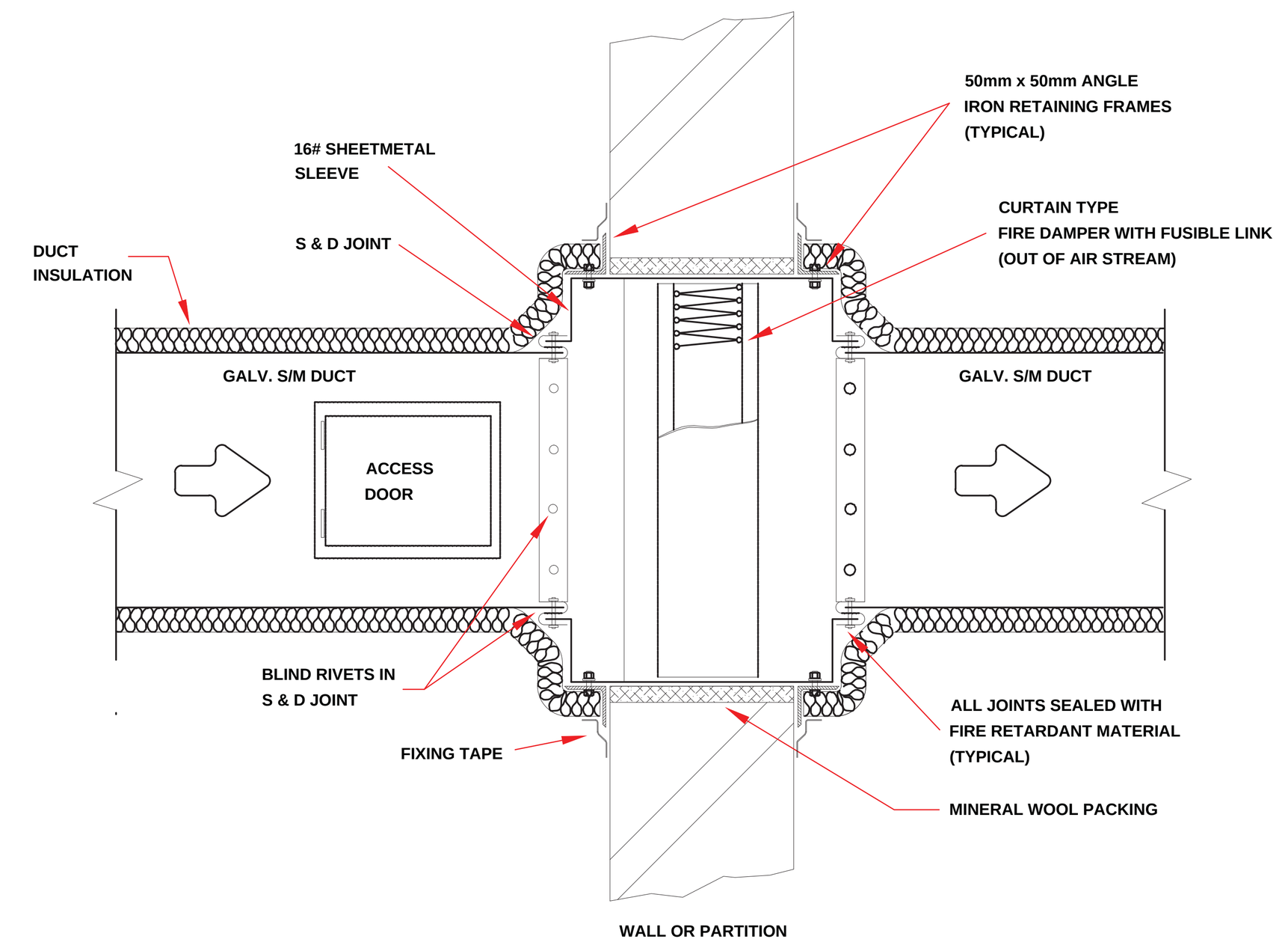
LONGER SIDE OF DUCT (mm)	SHEET METAL GAUGE (#)	MAXIMUM DISTANCE BETWEEN JOINTS (m)
≤ 300	24	2,4
300 TO 450	22	2,4
450 TO 750	22	2,4 OR 1,2
750 TO 1050	22	1,2
1050 TO 1350	22	1,2
1350 TO 1550	20	1,2
1550 TO 2150	20	1,2
2150 TO 2450	18	1,2

14 **A.C DUCT THICKNESSES AND PRESSURES**





15 **VANE LOCATION FOR RECTANGULAR ELBOWS**
N.T.S



ALL FIRE DAMPERS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA REGULATIONS

16 **FIRE DAMPER DETAIL**
N.T.S

MASTER
10 FEB 2017
AECOM TRANSNET

DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

NOTES

1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

AECOM
CAPE TOWN OFFICE
WATERSIDE PLACE, SOUTH GATE
TYGER WATERFRONT
CARL CRONJE DRIVE

TEL: +27 (0)21 950 7500
FAX: +27 (0)21 950 7502
REG. No. 1966/006628/07

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	KC	JJ	AD	27-01-17

REVISIONS

CONTRACTOR/CONSULTANT

TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS

TITLE	NAME	SIGN	DATE

TRANSNET CAPITAL PROJECTS

TITLE	NAME	SIGN	DATE
DRAWN	K.C.		27 01 17
CHECKED	J.J.		27 01 17
DESIGNED	J.J.		27 01 17
CHECKED	A.D.		27 01 17

PR.ENG./PR.TECH./PR.ARCH

NAME	ANDREW DALLY	DATE
SIGNATURE		27 01 17
REG. NUMBER	9170004	
SCALE:	N.T.S.	A0

Transnet Capital Projects
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1990/000900/06
TABLE BAY BUILDING, TYGERBERG PARK,
163 UYS KRIGE DRIVE, PLATTEKLOOF, TEL: 021 940 1999
8001 FAX: 086 677 2455

PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION M
STANDARD DUCTING DETAILS

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	510	M	ST	0004	01	00	AE

STANDARD PIPING NOTES

CHILLED WATER PIPE INSTALLATIONS

1. GENERAL

Refer to Project Technical Specification for specific details of piping installation.

Pipes, strainers and other fittings up to 50mm may be screwed or flanged.

Valves, strainers and other fittings larger than 50mm must be flanged.

Thread must be in accordance with BS 21 and flanges to ASA standard or BS 4504 unless otherwise specified.

Galvanised piping must be screwed when smaller than 50 mm and flanged above 50 mm.

Clean all piping before connecting.

Welding to galvanised piping or fittings is not permitted.

Where welding for whatever purpose is unavoidable the complete section must be hot dip galvanised after manufacture.

Cold galvanising is not acceptable.

Use full radius bends and sweep fittings wherever possible. Use elbows only under exceptional conditions

Where it is necessary to reduce pipes in size, use only reducing sockets and not bushes.

Provide all pipelines with 15mm drain cocks at all low points in the system so that the pipe work can be drained of liquid without dismantling.

Install horizontal pipes with a slope of at least 1 in 500 to allow venting of air to the expansion tank wherever possible. Fit all pipes in such a manner as to prevent the formation of air locks and air pockets. Provide high points with automatic air vent valves or air bottles. Air vents or bottles must be designed for at least 1,5 times the working pressure of the system.

Arrange piping in plant rooms so that normal inspection and servicing of equipment is not obstructed.

Size pipes which are not dimensioned on drawings using the following criteria:

- The velocity must not exceed 2,5 m/s.
- The friction rate must not exceed 60 kPA per 100m length.

Pipe expansion joints, where required, shall be of the bellows type manufactured from stainless steel or may be of the Viking Johnson pipe coupling or equal where moderate expansion movements are to be accommodated.

Chilled water piping shall be black medium tubing, conforming to SANS 62-1

Screwed joints may be used for piping of diameter up to and including 50mm diameter whereas all piping in excess of this diameter shall be jointed by the welded process, using flanges where stated below.

Pipes of diameter in excess of 150mm shall be constructed of seamless black steel in accordance with SABS 62-1971 with welded joints only.

All black pipe fittings shall conform with SABS 509-1955.

Welding of pipework shall be carried out only by qualified welders and the Employer reserves the right to have cut for examination.

Connections to air handling units, pumps, chillers and other major equipment shall be flanged in the case of piping of diameter 65mm and over and shall be joined using cone face unions in the case of piping of diameter less than 65mm, to enable sections of the air conditioning system to be removed and replaced.

In all piping installations due allowance shall be made for the thermal expansion and contraction of the piping material.

The chilled water system and the hot water system shall each be supplied with expansion tanks of the asbestos or copper type each with a minimum water volume of 150 litres, complete with ball valve, quick-fill and drain connections.

Automatic air release valves shall be fitted at the top of the riser pipe stacks, and in any other positions in the hot water, chilled water and condenser water systems where necessary to prevent airlocks and to facilitate commissioning of the pumping systems.

Condenser water pipes shall be of medium or heavy black steel piping to BS 1387 or SANS 719 specifications but shall be hot-dip galvanised after manufacture with a minimum coating of 300 g/m2.

Fittings shall be of heavy galvanised malleable steel or malleable iron with galvanising as above, and shall be manufactured to BS 1740 or SABS 509 specifications. Flanges shall be of cast iron or steel to BS 4504 or ASA Standards and shall be galvanised.

Drain pipes must fall with a gradient of 1:50.

Provide all drain pipes with cleaning eyes at each change in pipe direction. .

Domestic grade copper piping could be used for drain piping with elbows and fittings of the compression or solder type.

2. HANGERS AND SUPPORTS

Spring hanger mountings for vibration damping shall be used in all plant rooms.

Pipe hangers shall be adjustable in height to set the pipe gradient. .

The maximum horizontal support spacing and hanger rod diameters shall be as follows for steel chilled water, condenser water, hot water

Nominal Pipe size (mm)	Hanger Rod ø (mm)	Span (m)
12-32	6	2.5
40-65	10	3.0
80-100	12	3.5
125-150	16	4.0
200-300	22	5.0
350-500	25	6.0

The maximum horizontal support spacing for condensate (from AC units) pipes shall be as follows:

Nominal Pipe Size (mm)	Span (m)
12-20	1.0
25-40	2.0
50 and over	2.5

Hangers shall be provided at a maximum spacing of 1 metre from each elbow or pipe fitting.

3. VALVES

Valve materials shall be selected for the particular application.
For detailed valve specification refer to Project Technical Specification.
Saunders type valves or approved equivalent will be accepted.

Gate valves shall only be used as isolating or shut off valves.

Globe valves shall be used for throttling or balancing purposes.

Butterfly valves shall be used for isolating and shut off purposes.

Diaphragm valves shall only be used as shut-off purpose

Check valves shall be of the non-slam type for horizontal or vertical installation.

Plug cocks shall be used for balancing purposes.

Calibrated balancing valves shall be of the plug cock or globe type with bronze or cast iron valve bodies, bronze disc, internal seals, screwed ends, up to 50 mm and flanged ends for 65 mm ø and over. Valves shall be TOUR AGENTUR or approved equivalent.

4. STRAINERS

Strainers shall be of the angle or Y-type. Strainers up to 50 mm shall have screwed ends and strainers of 65 mm ø and above, shall have flanged ends.

Bronze or stainless steel screens will be acceptable.

Screens shall be perforated as follows:

Strainer Size (mm)	Perforation Size (mm)
10-50	1.0
65-150	1.5
200 and over	2.0

Strainers shall be provided with a 50mm blowdown pipe and cock on the cap piped to the nearest drainpoint. Flexible piping shall be used.

Strainers shall be installed on the inlet side of all hot water, chilled water and condenser water pumps.

5. GAUGES

Pressure gauges for water shall be of the Bourdon type and glycerine filled.

Pressure gauge dials shall have a diameter of at least 100 mm.

A gauge cock and siphon tube shall be provided with each gauge.

6. CONNECTIONS TO VIBRATING EQUIPMENT

Flexible connections shall be Mason Industries SAFEFLEX SFDEJ [double sphere type] or approved equivalent, which shall be provided to the suction and discharge pipes for chilled, condenser and hot water pumps.

7. TESTING OF PIPE INSTALLATIONS

All pipe fittings shall be tested hydrostatically up to a pressure of 1000 kPa or 1.5 times the maximum system pressure, whichever is the higher value.

Tests shall be carried out before the application of insulation.

Water systems shall be filled with water and air vented at least 24 hours before the test.

The test pressure shall be maintained for a period of at least 2 hours after the pressure testing pump has been disconnected.

8. FLUSHING/DRAINING

Upon the completion of all pressure tests throughout the building complex, and prior to the commencement of commissioning of pumping systems, the entire system shall be drained and flushed to ensure the removal of waste jointing material, accumulated dirt, and sundry construction materials.

Refer to Water Treatment section for method of cleaning and flushing a piping reticulation.

9. WATER TREATMENT

Refer to Project Technical Specification for specific details of "Water Treatment".

10. CHILLED WATER PIPEWORK INSULATION

All chilled water pipework, including pipe fittings and connections, shall be insulated with Polyisocyanurate (PIC) foam, with the necessary vapour barrier.

The insulation shall be applied as noted on the Detail Drawing.

Rigid preformed piping sections shall be used where applicable. Where not possible, Blocks/Batts shall be shaped to suit the pipe fitting, and securely wired/banded in position. All joints and voids shall be filled with mineral wool. The thickness of the insulation shall be maintained over the pipe fitting.

All piping shall be supported from the outside of the insulation as per Details shown. The compressive strength of the insulation shall be determined to ensure no flattening of the insulation (i.e the insulation must maintain it's thickness). Should the weight of the pipe, plus contents, cause the insulation to flatten, then either provide "saddles", or increase the density of the insulation over the bracket width.

REFRIGERATION PIPEWORK AND INSULATION

Refrigerant pipe work shall be installed on site in accordance with Project Technical Specification, and generally as shown on the Equipment layout drawings. All indoor and outdoor Refrigerant pipework shall be insulated and protected by sturdy covers against accidental damage, as needed.

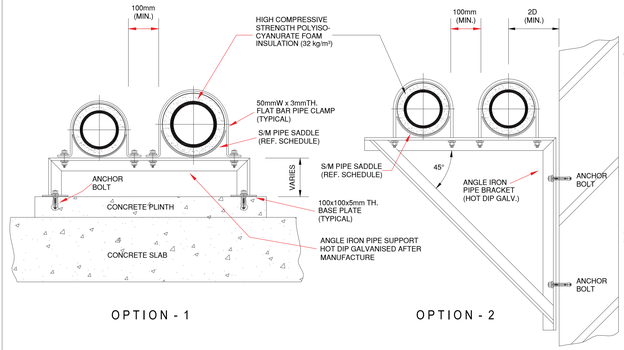
(i) Pipe Runs
(a) Type-L copper to be used.
(b) Horizontal pipes carrying vapour are to be sloped in the direction of the vapour flow.
(c) Piping to be sized to ensure the correct Refrigerant velocities and pressure drops.
(d) Liquid lines running over exposed roofs to be insulated.
(e) All internal Refrigerant pipework shall be insulated with Armaflex, or approved equal.
(f) All external Refrigerant pipework shall be insulated with 25mm thick rigid, pre-formed fibreglass sections of 48 kg/m³ density.
(g) All external Refrigerant pipework shall be vapour-sealed and cladded with Aluminium sections, or approved equal.
(h) Refer to "Typical Refrigerant Piping Diagram" detail below.
(i) All Refrigerant pipe runs / lengths to be in accordance with Supplier Requirements.
(j) All Refrigerant pipes to run in cable trays. When external to the Building, a protective cover must be fitted.

(ii) Oil Traps
(a) To be fitted at the bottom of all risers.
(b) To be fitted every 7 metres up a riser.
(c) No traps near the suction inlet of a compressor.

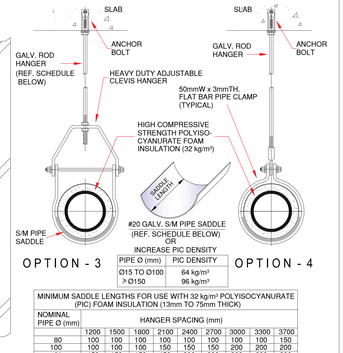
(iii) Before starting a system ensure that the Pipework is clean, and free of Contaminants.
(a) Contaminants: Air, Moisture, Copper Oxide, Metal chips and dirt.
(b) Contaminants will cause Compressor failure.
(c) Purge system with dry Nitrogen.
(d) Draw a vacuum.

(iv) Oil return to Compressor
(a) Oil travels with the Refrigerant around the system.
(b) Excessive lengths of pipework is detrimental to oil return to the Compressor.
(c) After start-up of the system, check Compressor oil level, and top up if necessary.
(d) Should the pipe lengths be run beyond the Manufacturer's recommendations, then topping up of Compressor oil is necessary.

(v) Suction line Accumulator
(a) Required to prevent Liquid flooding back to the Compressor, after the system is shut down.
(b) Systems which have excessive lengths of pipe, and fitted with "Capillary tube metering devices" must be fitted with an Accumulator.
(c) Suction Accumulator to either be part of the Condensing unit, or fitted within the Suction line.
(d) Suction Accumulator must be correctly sized.



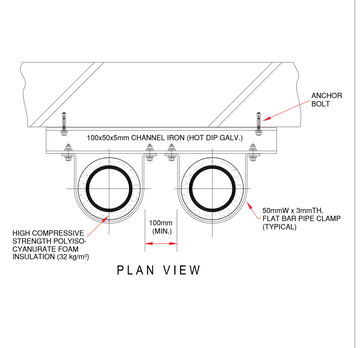
1 HORIZONTAL CHILLED / HOT WATER PIPE SUPPORTS
N.T.S



PIPE Ø (mm)	PIC DENSITY
Ø15 TO Ø100	64 kg/m³
> Ø150	96 kg/m³

MINIMUM SADDLE LENGTHS FOR USE WITH 32 kg/m³ POLYISOCYANURATE (PIC) FOAM INSULATION (13mm TO 75mm THICK)

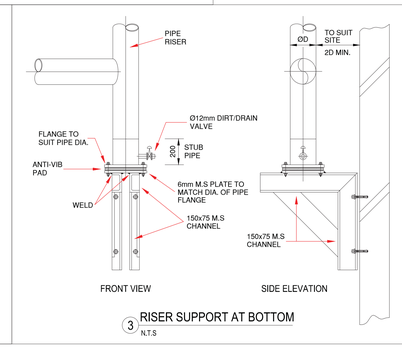
NOMINAL PIPE Ø (mm)	HANGER SPACING (mm)								
	1200	1500	1800	2100	2400	2700	3000	3300	3700
80	100	100	100	100	100	100	100	100	150
100	100	100	100	150	150	150	200	200	200
150	150	150	150	150	200	200	200	200	200
200	200	200	200	200	200	200	200	200	300
250	200	200	200	300	300	300	300	300	300
300	200	200	300	300	300	300	300	300	300
400	300	300	450	450	450	450	450	450	450



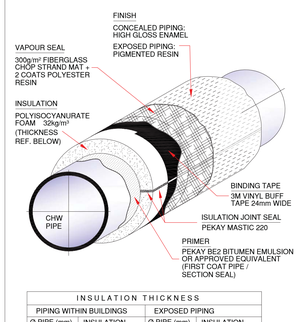
2 VERTICAL CHILLED / HOT WATER PIPE SUPPORTS
N.T.S

LEGEND

PUMP
BUTTERFLY VALVE
ISOLATING VALVE
BALL VALVE
BALL VALVE AND S-TUBE
BALANCING VALVE
THERMOSTATIC VALVE
NON-RETURN (CHECK) VALVE
SOLENOID VALVE
MOTORISED CONTROL VALVE
STRAINER WITH BALL VALVE
UNION
FLEXIBLE CONNECTION
EXPANSION TANK
FLOW SWITCH
FLOW METER
AUTOMATIC AIR VENT
BINDER TEST ARRANGEMENT
SUMMIT POINT
PRESSURE GAUGE
TEMPERATURE GAUGE

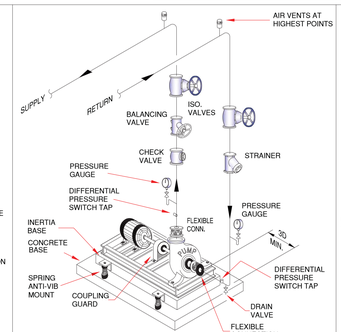


3 RISER SUPPORT AT BOTTOM
N.T.S

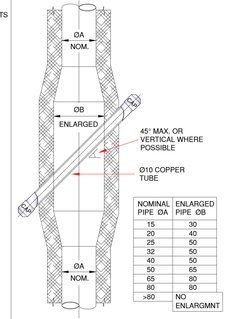


INSULATION THICKNESS			
PIPING WITHIN BUILDINGS		EXPOSED PIPING	
Ø PIPE (mm)	INSULATION THICKNESS (mm)	Ø PIPE (mm)	INSULATION THICKNESS (mm)
15 TO 80	25	15 TO 65	25
> Ø100	50	> Ø80	50

4 CH. WATER PIPE INSULATION DETAIL
N.T.S

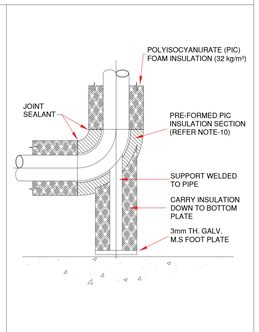


5 PUMP CONNECTION DETAILS
N.T.S

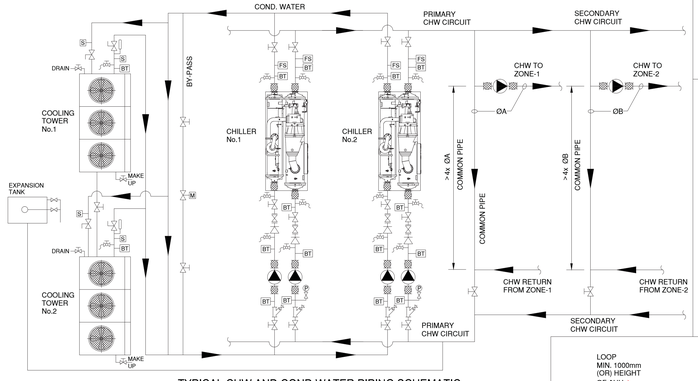


NOMINAL PIPE ØA	ENLARGED PIPE ØB
15	30
20	40
25	50
32	50
40	50
50	65
65	80
80	80
>80	NO ENLARGMNT

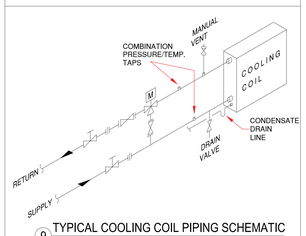
6 TEST THERMOMETER POCKET
N.T.S



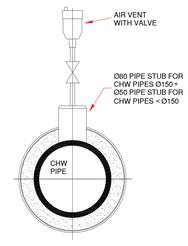
7 PEDESTAL SUPPORT AT ELBOW
N.T.S



8 TYPICAL CHW AND COND.WATER PIPING SCHEMATIC
N.T.S



9 TYPICAL COOLING COIL PIPING SCHEMATIC
N.T.S



10 AIR VENT DETAIL
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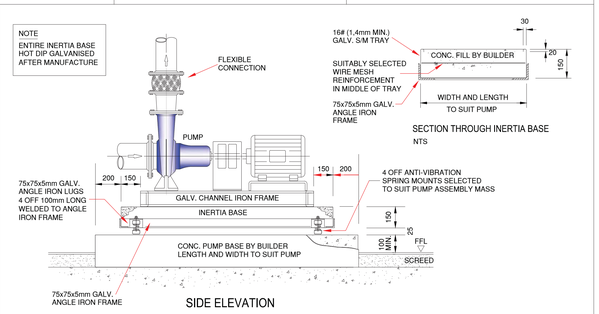
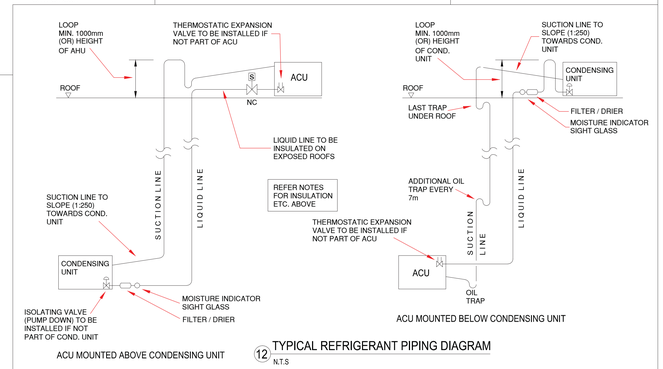
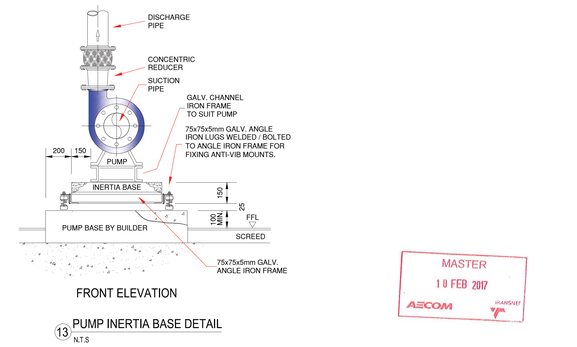
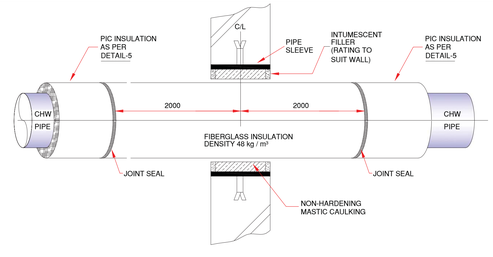




12 TYPICAL REFRIGERANT PIPING DIAGRAM
N.T.S



13 PUMP INERTIA BASE DETAIL
N.T.S



11 DETAIL OF CHW PIPE THROUGH FIRE-RATED WALL
N.T.S

MASTER
18 FEB 2017
AECOM
TRANSNET

NOTES

1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

AECOM

CAPE TOWN OFFICE
WATERSIDE PLACE, SOUTH GATE
TYGER WATERFRONT
CARL CRONJE DRIVE

TEL: +27 (0)21 950 7500
FAX: +27 (0)21 950 7502
REG. No. 1966/006628/07

REVISIONS

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	KC	JJ	AD	27-01-17

CONTRACTOR/CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	K.C.		27 01 17
				CHECKED	J.J.		27 01 17
				DESIGNED	J.J.		27 01 17
				CHECKED	A.D.		27 01 17

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

PR.ENG./PR.TECH./PR.ARCH		
NAME	ANDREW DALLY	DATE
SIGNATURE		27 01 17
REG. NUMBER	9170004	
SCALE:	N.T.S.	A0

Transcribe Capital Projects
TRANSNET LTD. (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1990/000900/06
TABLE BAY BUILDING, TYGERBERG PARK,
163 UYS KRIGE DRIVE, PLATTEKLOOF,
8001
TEL: 021 940 1999
FAX: 086 677 2455

PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION M
STANDARD PIPING DETAILS

PROJECT NUMBER							OD	FBS		DIS	TYPE	DRAWING NO.				SHEET	REV	ID
1	9	2	4	7	0	1	2	5	1	0	M	S	T	0	0	0	5	0	1	0	0	AE

STANDARD DUCTING NOTES

THIS IS A GENERIC LEGEND AND NOT ALL ITEMS MAY BE APPLICABLE TO THIS SPECIFIC HVAC CONTRACT.

1. THE ENTIRE HVAC SYSTEM TO COMPLY WITH THE PROJECT TECHNICAL SPECIFICATION WHICH THIS DRAWING FORMS PART OF.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED. SIZES SHOWN FOR THE DUCTS ARE CLEAR INTERNAL DIMENSIONS.
3. CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF ANY WORKS. ANY DISCREPANCY TO BE REPORTED TO THE EMPLOYER.
4. ALL HEATING, VENTILATION AND AIR CONDITIONING DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL PROJECT NOTES AND SPECIFICATIONS, AS ISSUED BY AECOM, AND RELEVANT ARCHITECTURAL, ELECTRICAL AND STRUCTURAL DRAWINGS
5. CAPACITIES, DIMENSIONS AND LOCATIONS OF HEATING, VENTILATION AND AIR CONDITIONING EQUIPMENT ARE BASED ON EQUIPMENT MODELS INDICATED IN HVAC EQUIPMENT CATALOGUES, SCHEDULES AND DRAWINGS.
6. ACCESS TO ALL HVAC EQUIPMENT AND ACCESSORIES SHALL BE AS PER DRAWINGS AND MANUFACTURERS' REQUIREMENTS.
7. ALL WATER PROOFING OF PENETRATIONS AND COUNTER FLASHINGS TO BE DONE BY SPECIALIST SUB-CONTRACTOR, TO BE APPOINTED BY CONTRACTOR.
8. STATIC PRESSURES FOR ALL THE FANS MUST BE VERIFIED PRIOR TO ORDERING THE FANS.
9. ALL THE TOILET DOORS TO BE UNDERCUT 25mm, OR PROVIDED WITH DOOR GRILLES.
10. ALL MATERIALS EXPOSED TO THE AIRFLOW WITHIN THE CEILING CAVITY PLENUM SHALL BE NON-COMBUSTIBLE OR LIMITED COMBUSTIBLE, WITH A MAXIMUM SMOKE DEVELOPMENT INDEX OF 50.
11. FINAL LOCATIONS & DIMENSIONS OF CONCRETE UPSTANDS FOR THE HVAC EQUIPMENT AND HVAC PIPING SHALL BE CHECKED ON SITE TO SUIT HVAC EQUIPMENT SPECIFIED.
12. ALL THE EXTERNAL SUPPORT BRACKETS, SHALL BE HOT DIP GALVANISED BEFORE INSTALLATION.
13. WHERE DUCTS AND PIPES PASS THROUGH WALLS, SLEEVES SHALL BE PROVIDED, AND SEALED WITH AN APPROPRIATE FIRE RATED SEALANT TO PROVIDE AN AIR-TIGHT INSTALLATION.
14. ALL EQUIPMENT DUTIES ARE GIVEN AS RATED DESIGN DUTIES WITH AIR VOLUMES CORRECTED FOR SITE ELEVATION ABOVE SEA LEVEL.
15. DIRECTION ARROWS AND IDENTIFICATION BANDS ARE TO BE PLACED EVERY TWO METER INTERVALS OVER THE INSULATION FOR ALL SERVICES.
16. ALL BENDS / ELBOWS WHICH HAVE A THROAT RADIUS LESS THAN 3/4 OF THE HEEL RADIUS MUST BE VANED. REFER TO CHART BELOW.
17. ALL AIR DIFFUSION EQUIPMENT SHALL BE SELECTED AND INSTALLED AS PER THE SUPPLIERS' DETAILED SPECIFICATIONS, AND ALL BRANCH DUCTS / CONNECTIONS TO AIR DIFFUSERS TO BE FITTED WITH DUCT BALANCING DAMPERS, AS SHOWN ON DRAWINGS.
18. ALL AIR CONDITIONING DUCTWORK TO BE LAGGED WITH RIGID FIBERGLASS SLAB COVERED WITH REINFORCED ALUMINIUM FOIL, AND FINISHED WITH A VAPOUR SEAL BARRIER:
 - 25mm THICK FIBERGLASS FOR INTERNAL DUCTWORK @ 24 kg/m³
 - 50mm THICK FIBERGLASS FOR EXTERNAL DUCTWORK @ 32 kg/m³, AND FINISHED WITH A WATER PROOF BARRIER.
 - HARD INSULATION UNDER SUPPORTS. (REFER DETAIL-10)
19. ALL THE SUPPLY SLOT DIFFUSERS & RETURN SLOT DIFFUSERS SHALL BE SIMILAR TO TROX TYPE - ALS OR APPROVED EQUIVALENT.
20. FINAL LOCATION OF ALL AIR DIFFUSION EQUIPMENT SHALL BE CO-ORDINATED WITH THE CEILING TILES, LIGHTING FIXTURES AND OTHER CEILING FIXTURES ON SITE.
21. FLEXIBLE DUCT TO ANY AIR OUTLET SHALL NOT EXCEED A LENGTH OF 1500mm, AND SHOULD BE STRAIGHT TO ACHIEVE MINIMUM AIR RESISTANCE AND NOISE.
22. ALL OUTSIDE AIR INTAKE OPENINGS SHALL BE PROVIDED WITH FILTERS UNLESS OTHERWISE NOTED ON THE HVAC DRAWINGS. OPENINGS TO BE MINIMUM 500mm ABOVE ROOF / GROUND LEVEL.
23. ALL DUCTWORK WORK RUNNING THROUGH HIGH HUMIDITY AREAS SHALL BE WRAPPED WITH 25mm THICK 32kg / m³ DENSITY FIBERGLASS INSULATION.
24. ALL THE OUTLETS FOR SUPPLY, RETURN, TRANSFER & EXHAUST AIR SHALL BE PROVIDED WITH VOLUME CONTROL DAMPERS. ALL DUCT CONNECTIONS FROM MAIN DUCTS TO BE PROVIDED WITH SPLITTER TYPE DAMPERS, OR AS OTHERWISE NOTED ON THE DRAWINGS.
25. ALL TRANSFER DUCTS SHALL BE PROVIDED WITH BACK DRAFT DAMPERS, IN ORDER TO PREVENT AIR FLOW IN THE OPPOSITE DIRECTION.
26. ALL AIR DIFFUSION EQUIPMENT SHALL BE EPOXY MATT WHITE, UNLESS SPECIFIED OTHERWISE.
27. FINAL SIZE OF ALL THE WEATHER LOUVRES DEPEND ON THE FAN SPECIFIED.
28. BACKDRAFT DAMPERS SHALL BE SIMILAR TO TROX TYPE - ARK OR APPROVED EQUIVALENT.
29. DUCTWORK AS NOTED IN MATERIAL SCHEDULE SHALL BE FABRICATED, CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH THE SMACNA STANDARD.
 THIS WILL INCLUDE PROVISION FOR ALL TEST POINTS TO ENABLE AIR BALANCING AND COMMISSIONING ACTIVITIES TO BE PERFORMED. (REFER TO DETAIL BELOW)
30. HINGED ACCESS DOORS SHALL BE PROVIDED ON THE LINK SIDE OF ALL FIRE DAMPERS AND CONTROL DAMPERS, AND GENERALLY AS RECOMMENDED BY THE SMACNA STANDARD.
31. FILTER SPECIFICATION
 PRIMARY AIR FILTER MATERIAL SHALL BE CAPABLE OF BEING WASHED AT LEAST 12 TIMES, AND HAVE AVERAGE ARRESTANCE OF 80% ACCORDING TO THE ASHRAE 52 / 76 STANDARD.
 SPARE FILTERS SHALL BE PROVIDED.
 FILTERS TO BE HOUSED IN PURPOSE-MADE FILTER HOUSINGS WITH AIRTIGHT ACCESS DOORS.
32. KITCHEN HOOD AND DUCT DETAILS
 a. THE HOOD SHALL BE CONSTRUCTED FROM AND BE SUPPORTED BY STAINLESS STEEL TYPE 430 NOT LESS THAN 1.2mm (OR) OF OTHER APPROVED MATERIAL OF EQUIVALENT STRENGTH, FIRE AND CORROSION RESISTANCE
 b. DUCTS SHALL BE CONSTRUCTED OF AND SUPPORTED BY CARBON STEEL NOT LESS THAN 1.37mm (16#) (OR) STAINLESS STEEL NOT LESS THAN 1.2mm (18#)
 c. ALL BEAMS AND JOINTS SHALL HAVE LIQUID-TIGHT CONTINUOUS EXTERNAL WELDS
 d. FIRE SUPPRESSION SYSTEM TO BE DONE BY SPECIALIST SUB-CONTRACTOR, TO BE APPOINTED BY CONTRACTOR.
 e. FIRE WALL SHALL BE 2-HOUR RATED TO ENCLOSE EXHAUST DUCT.
 f. FILTERS MUST BE "UL" CLASSIFIED, STAINLESS STEEL, NON-CLOGGING BAFFLE-TYPE, AND SHOULD BE EASILY REMOVABLE
 g. A RESIDUE TRAP SHALL BE PROVIDED AT THE BASE OF EACH VERTICAL RISER, WITH PROVISIONS FOR CLEANOUT
 h. AN OPENING, LARGE ENOUGH TO PERMIT CLEANING, SHALL BE PROVIDED AT EACH CHANGE IN DIRECTION OF THE DUCT, FOR THE PURPOSES OF INSPECTION AND CLEANING. SUCH OPENING SHALL BE AT THE SIDES OF THE DUCT AND AT EVERY TWO METER IN HORIZONTAL DUCTWORK.
 i. AFTER INSTALLATION OF FILTERS, THE REMAINING AREA OF THE HOOD TO BE CLOSED OFF
 J. KITCHEN EXHAUST DUCTS SHALL BE CONSTRUCTED IN COMPLIANCE WITH NFPA STANDARDS
33. MAIN HVAC ELECTRICAL POWER SUPPLY CABLE TO BE COPPER.
34. ALL HEATER BANKS TO BE HOUSED IN FLANGED STEEL CASINGS FOR EASY REMOVAL AND COMPLY WITH THE FOLLOWING SAFETY REQUIREMENTS:
 - AIR PRESSURE SWITCH / SAIL SWITCH
 - OVERHEAT THERMOSTAT WITH MANUAL RESET
 - BACK OF TERMINAL BOX TO BE INSULATED
 - ACCESS DOOR INTERLOCKED WITH HEATER BANK
 - HEATER ELEMENTS TO BE SIZED TO SUIT NUMBER OF STEPS AND BALANCE POWER OVER THE THREE PHASES
 - PROPORTIONAL OUTPUT CONTROL TO BE PROVIDED
 - HEATER ELEMENTS TO BE INCOLOY TYPE OR APPROVED EQUIVALENT & CHOSEN FOR "BLACK HEAT" OPERATION. (HEATING INTENSITY NOT MORE THAN 3 WATTS)
 - INSULATION SHALL BE 6mm THICK NON ASBESTOS MILL BOARD, LOCATED 300mm UPSTREAM AND 600mm DOWNSTREAM
35. ALL MACHINES AND MOTORS (ABOVE 0.75 kW) SHALL INCORPORATE THE FOLLOWING:-
 a. HIGH EFFICIENCY MOTORS (LOW COPPER AND IRON LOSSES)
 b. POWER FACTOR CORRECTION TO 0.95
 c. SPEED CONTROLLERS WITH VARIABLE / AUTOMATIC CONTROL VIA. BMS WITH 4 - 20 mA CONTROL (IF REQUESTED)
 d. ALL CONTROL TRANSFORMERS SHALL BE HIGH EFFICIENCY (LOW COPPER AND IRON LOSSES)
36. MOTOR POWER FOR ALL THE HVAC EQUIPMENT SHALL BE VERIFIED ONCE ORDERED
37. SOUND ATTENUATION
 a. ALL FACTORY-MADE SOUND ATTENUATORS TO BE SELECTED AND LOCATED AS PER THE "HOWDEN-DONKIN" COMPANY REQUIREMENTS.
 b. ALL SOUND ATTENUATORS TO BE LINED WITH MELINEX FILM, OR APPROVED EQUIVALENT.
 c. TRANSITION DUCTWORK BETWEEN ATTENUATORS AND AIR-CON UNITS TO BE PROVIDED WITH ACOUSTIC INSULATION AS PER DETAIL 11 ON THIS DRAWING.
 d. ALL DUCT LINING MATERIAL SHALL COMPLY WITH SABS STANDARDS.
 e. OCCUPIED ROOMS SHALL ATTAIN THE SOUND LEVELS AS NOTED IN THE ASHRAE APPLICATIONS HANDBOOK, CHAPTER - "SOUND AND VIBRATION CONTROL".
38. VIBRATION ISOLATION OF EQUIPMENT
 ALL ROTATIONAL EQUIPMENT WHICH HAS A POWER CONSUMPTION IN EXCESS OF 1kW SHALL BE FITTED WITH VIBRATION ISOLATORS TO ENSURE NO EQUIPMENT VIBRATION IS TRANSMITTED INTO THE STRUCTURE. VIBRATION ISOLATORS SHALL BE SELECTED IN ACCORDANCE WITH THE MASON INDUSTRIES SELECTION DATA CONSIDERING A MINIMUM 0F 5% TRANSMISSION OF VIBRATION.
39. FOR ALL THE HVAC EQUIPMENT, A CONDENSATE DRAIN SHOULD BE PROVIDED WITHIN TWO METERS OF THE UNIT, BY OTHERS, UNLESS STATED OTHERWISE.

LEGEND

(T)	- THERMOSTAT
°C	- DEGREE CENTIGRADE
l/s	- LITRES PER SECOND
DAC	- DOOR AIR CURTAIN
db	- DRY BULB
EAD	- EXHAUST AIR DUCT
E/A	- EXHAUST AIR
EDH	- ELECTRIC DUCT HEATER
EG	- EXHAUST AIR GRILLE
ESP.	- EXTERNAL STATIC PRESSURE
EF	- EXHAUST FAN
FAD	- FRESH AIR DUCT
FCU	- FAN COIL UNIT
Pa	- PASCAL
kW	- KILO WATT
QTY.	- QUANTITY
R/A	- RETURN AIR
RAG	- RETURN AIR GRILLE
RLG	- RETURN LINEAR GRILLE
RWG	- RETURN WALL GRILLE
S/A	- SUPPLY AIR
SAF	- SUPPLY FAN
SCG	- SUPPLY CEILING GRILLE
SCD	- SUPPLY CEILING DIFFUSER
S.S	- STAINLESS STEEL
SWG	- SUPPLY WALL GRILLE
T/A	- TRANSFER AIR
TAG	- TRANSFER AIR GRILLE
TAD	- TRANSFER AIR DUCT
TEMP	- TEMPERATURE
UC OR ●	- UNDER CUT (25mm) MIN.
wb	- WET BULB
W.O	- WALL OPENING
F.D	- FIRE DAMPER (? HOUR RATING)
F.S.D	- FIRE/SMOKE DAMPER (? HOUR RATING)

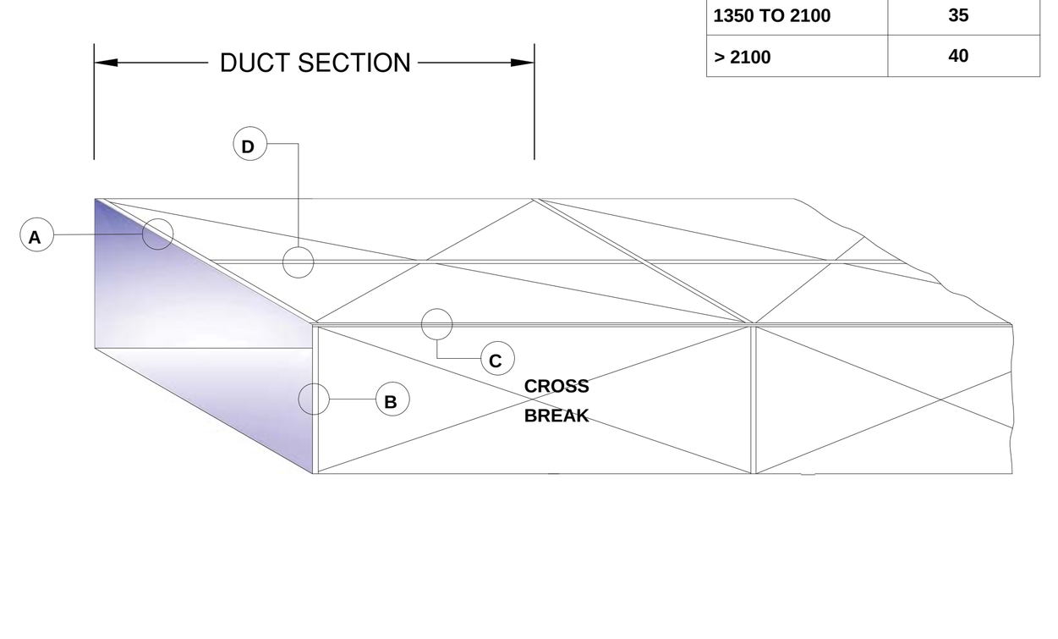
4-WAY BLOW DIFFUSER

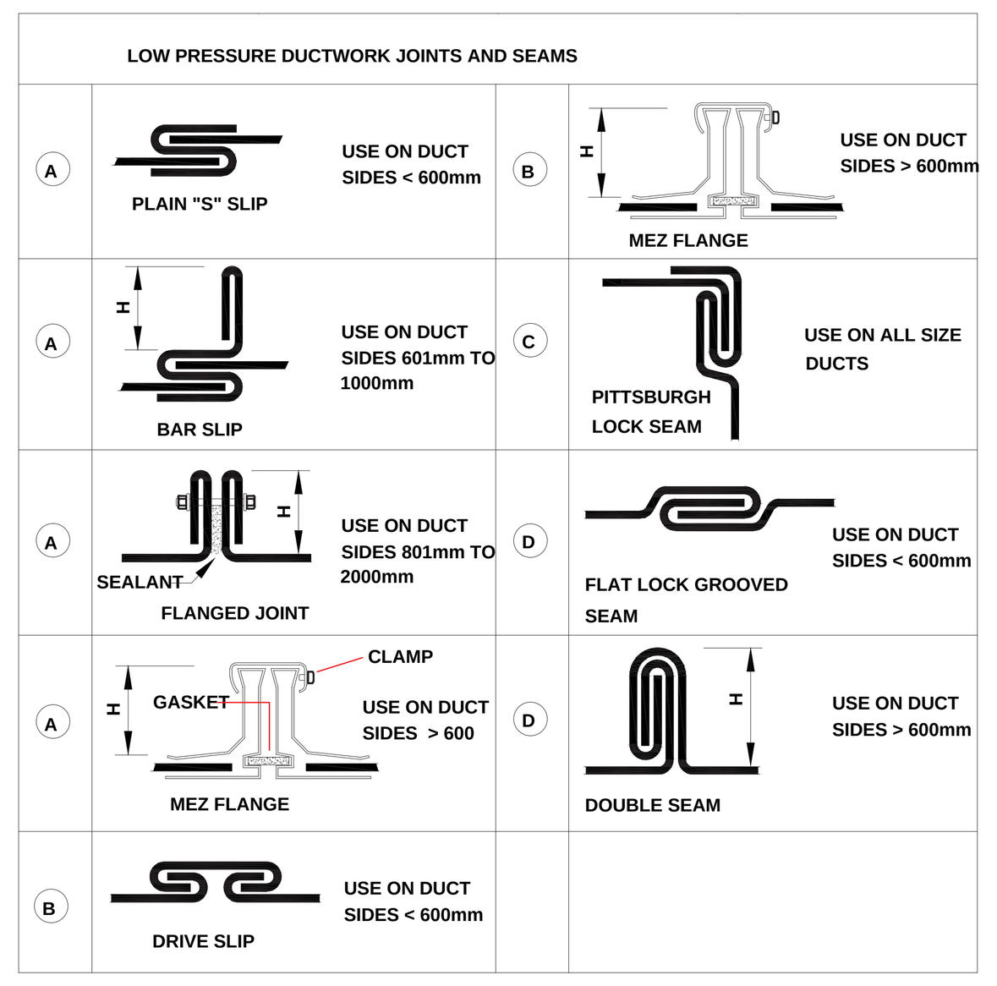
3-WAY BLOW DIFFUSER

- WALL GRILLE DOUBLE DEFLECTION
- INSULATED FLEXIBLE DUCT
- COMMISSIONING POINT
- (LI) LOCAL ISOLATOR

UPSTAND SEAM DIMENSION TABLE

LONGER DUCT DIMENSION (mm)	"H" (mm)
< 750	25
750 TO 1350	25
1350 TO 2100	35
> 2100	40

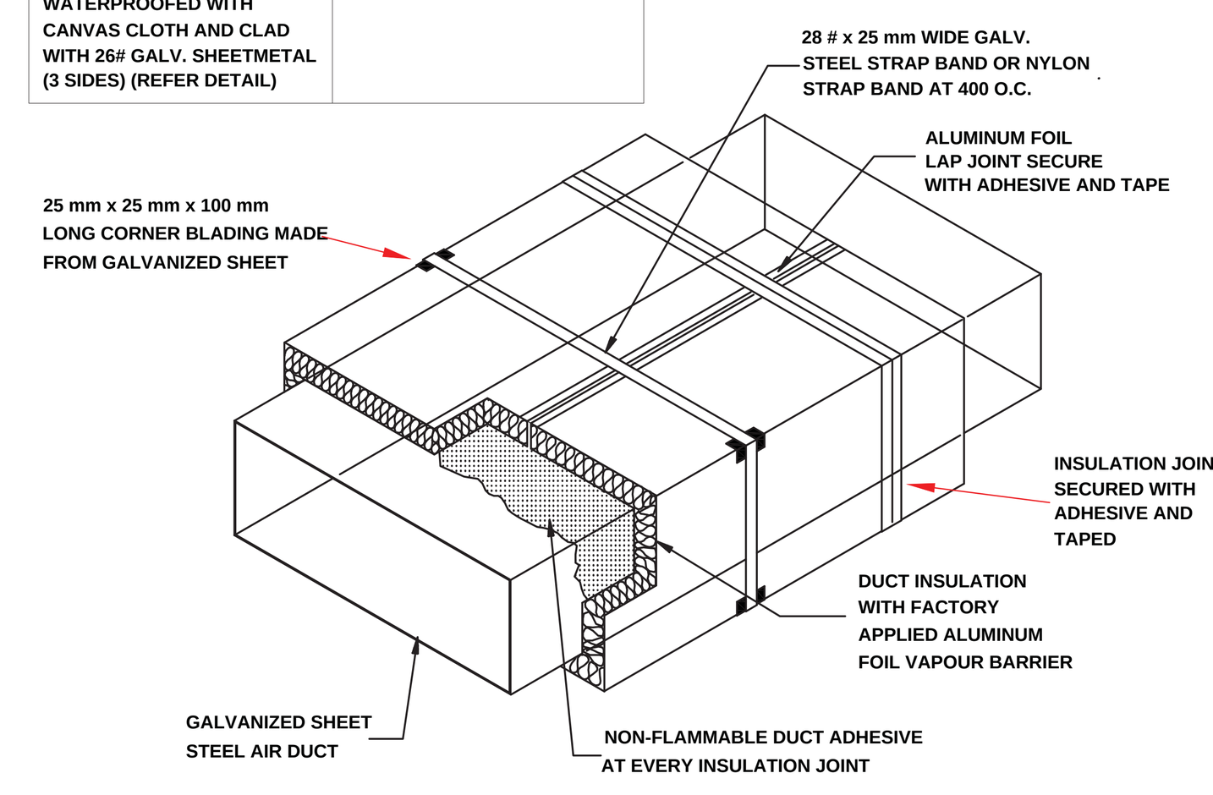




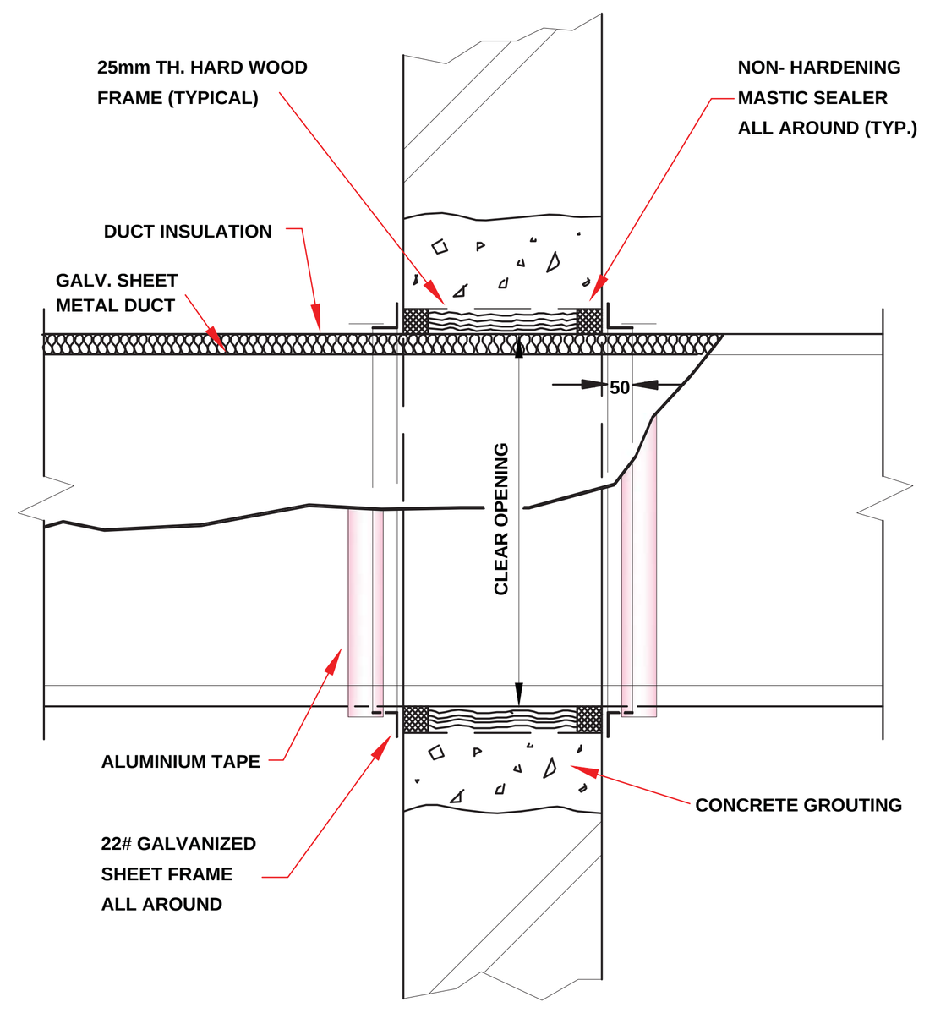
1 EXAMPLES OF LOW PRESSURE DUCT JOINTS & SEAMS
N.T.S
REFER TO SANS 1238 (LATEST EDITION) FOR FURTHER DETAILS OF LOW, MEDIUM & HIGH PRESSURE DUCTS

INSULATION NOTES

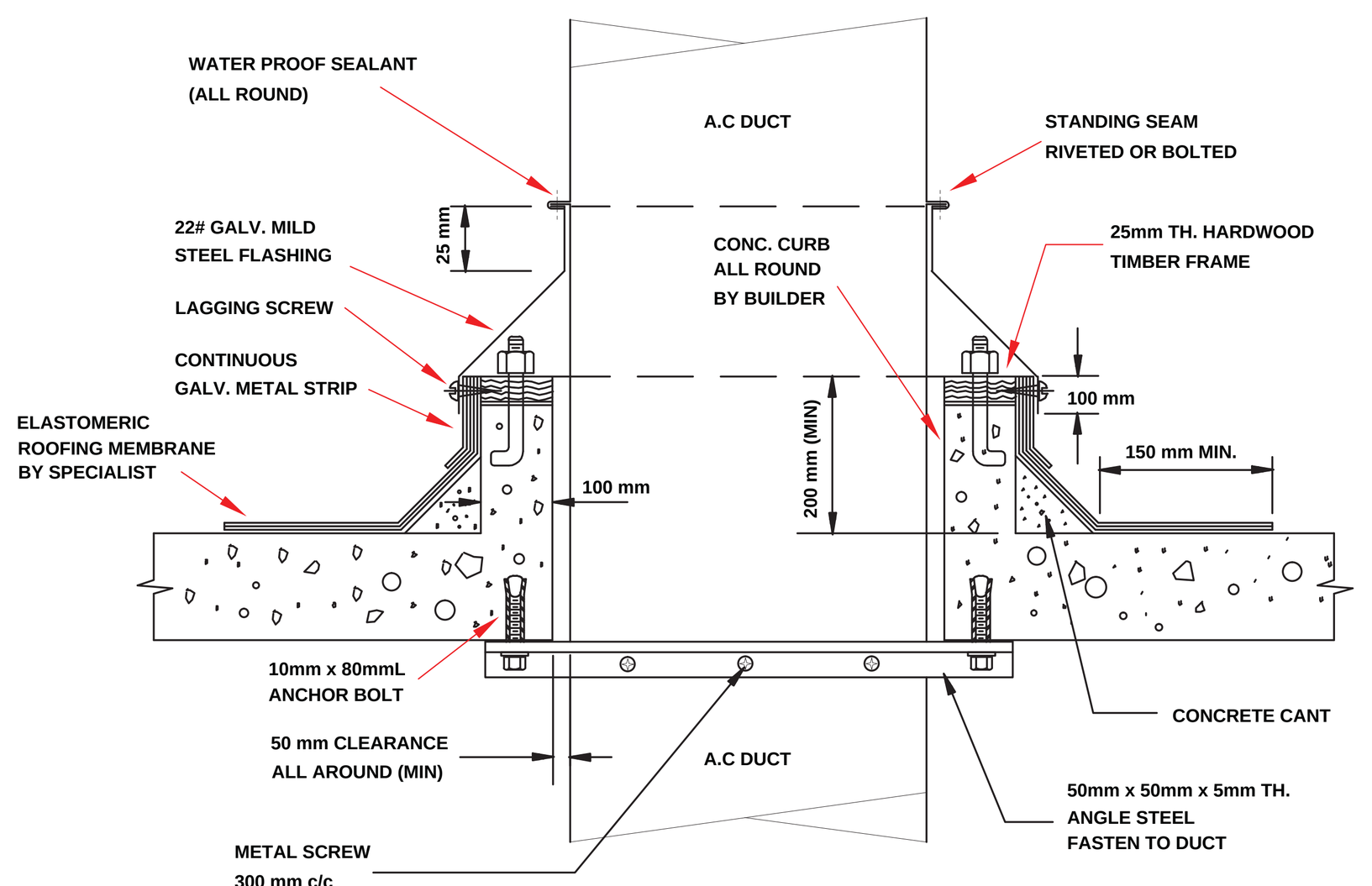
EXTERNAL DUCTS	INTERNAL DUCTS
50mm THICK FIBREGLASS DENSITY: 32kg/m³ WITH ALUMINIUM FOIL-FACED WRAPPING & VAPOUR-SEAL. WATERPROOFED WITH CANVAS CLOTH AND CLAD WITH 26# GALV. SHEETMETAL (3 SIDES) (REFER DETAIL)	25mm THICK FIBREGLASS DENSITY: 24kg/m³ WITH ALUMINIUM FOIL-FACED WRAPPING AND VAPOUR-SEAL



2 RECTANGULAR DUCT INSULATION DETAIL
N.T.S

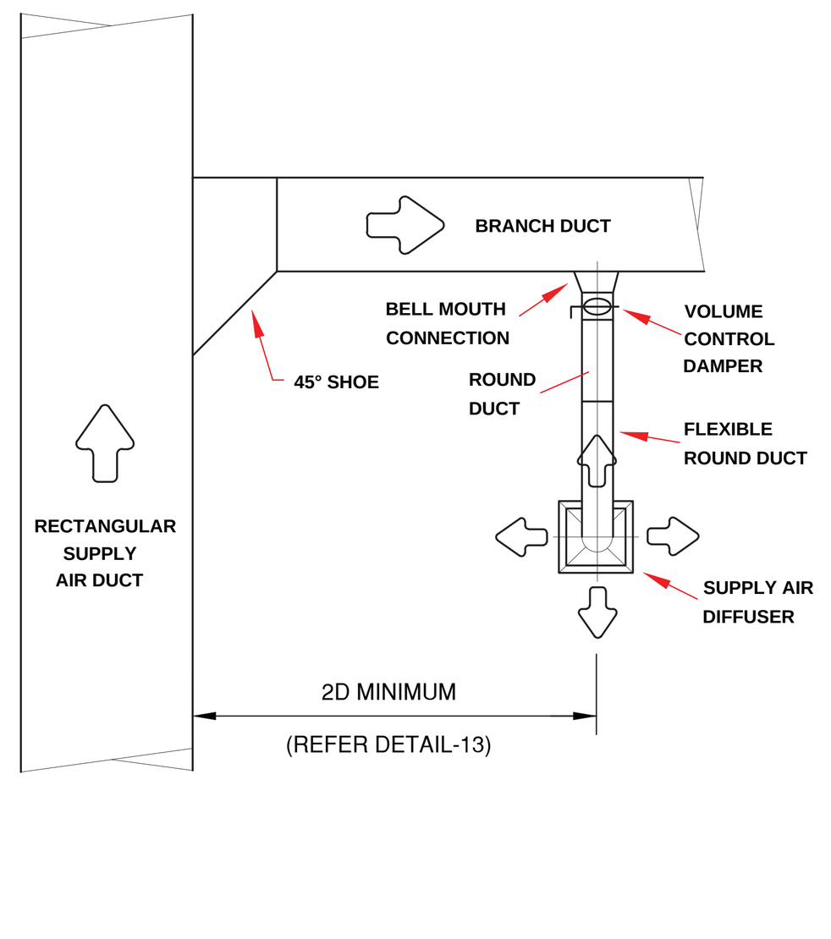


3 DUCT THRU WALL DETAILS
N.T.S

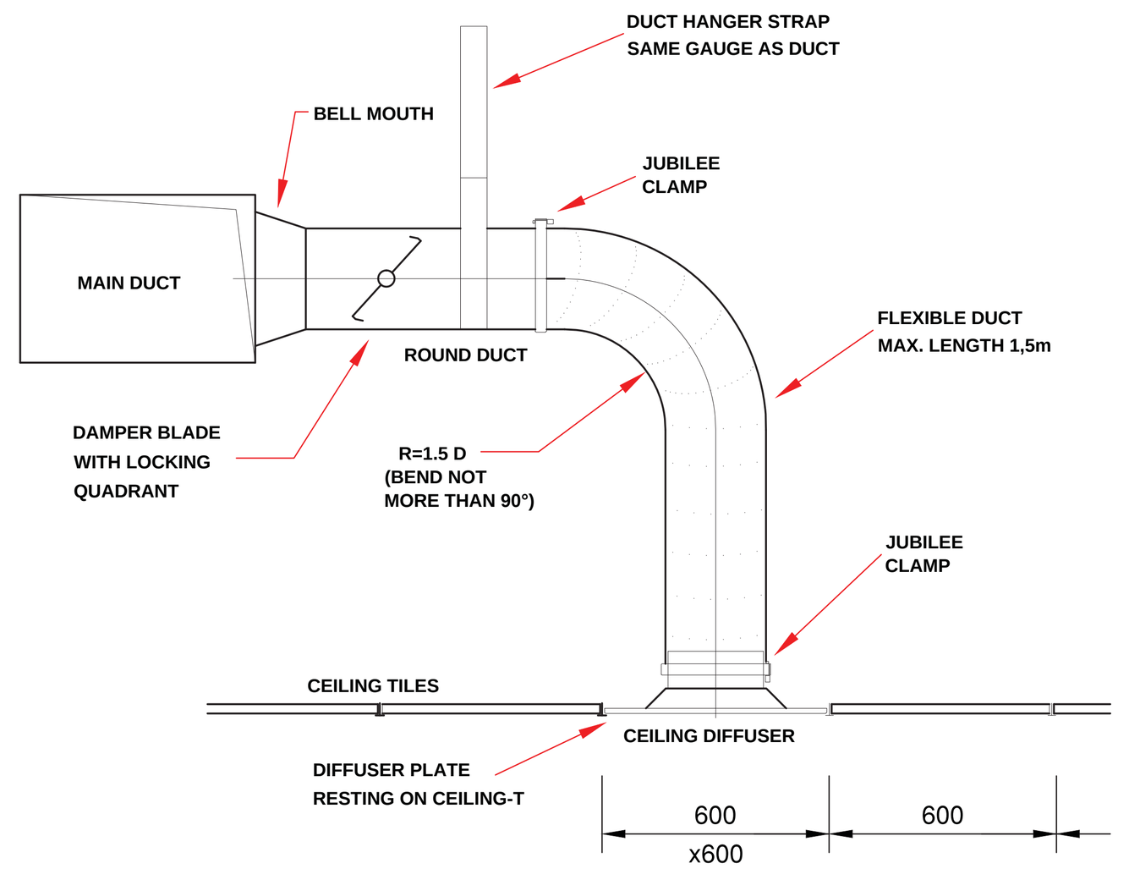


NOTE:
FLASHING AND SUPPORT MATERIAL TO BE COMPATIBLE WITH DUCT WORK MATERIAL

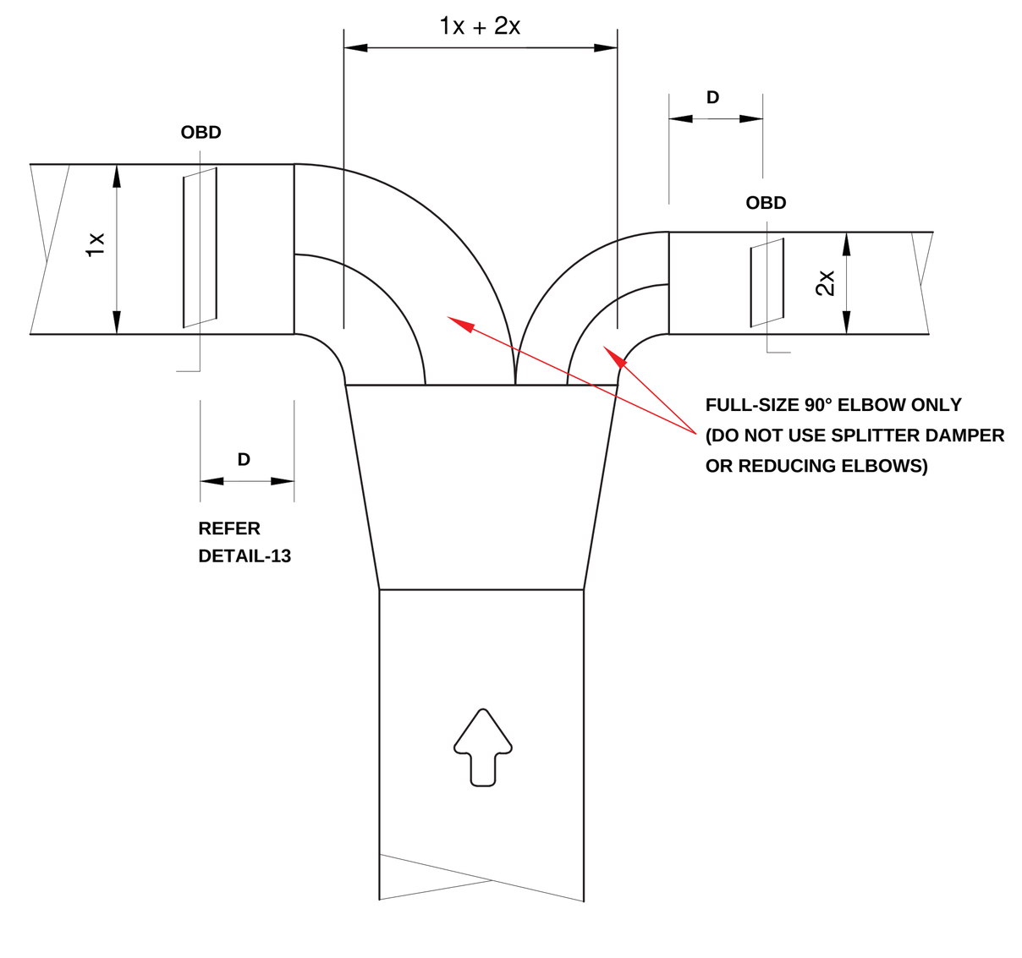
4 DUCT THRU ROOF DETAILS
N.T.S



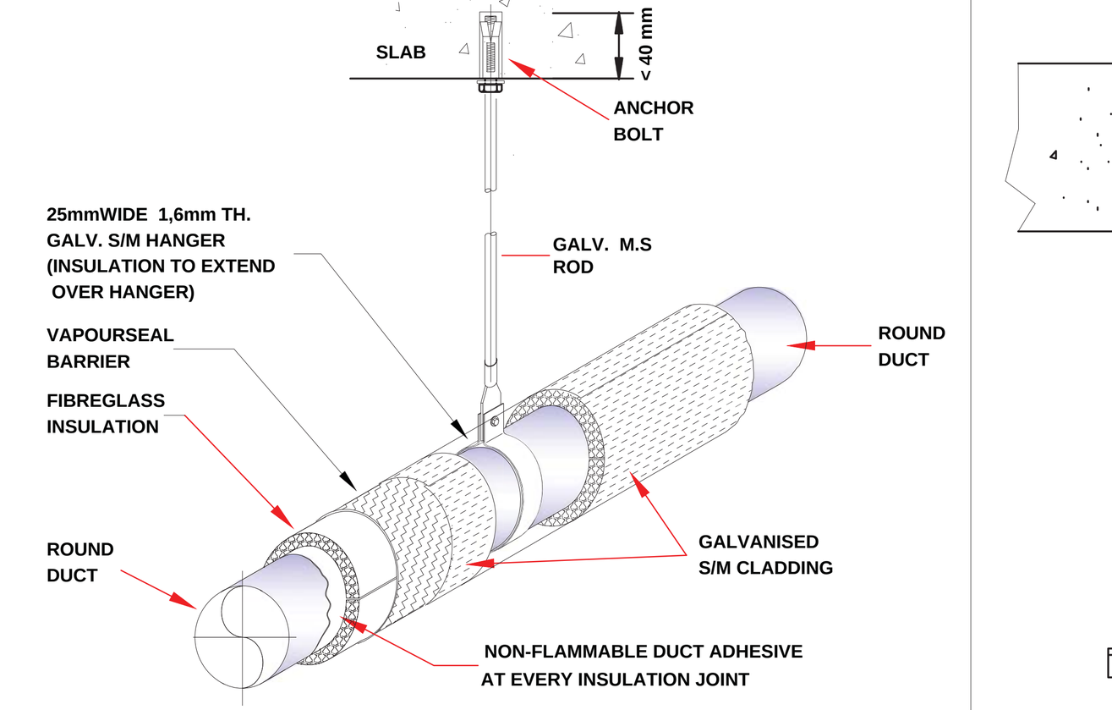
5 TYPICAL BRANCH CONNECTION DETAIL
NTS



6 FLEXIBLE DUCT INSTALLATION
N.T.S



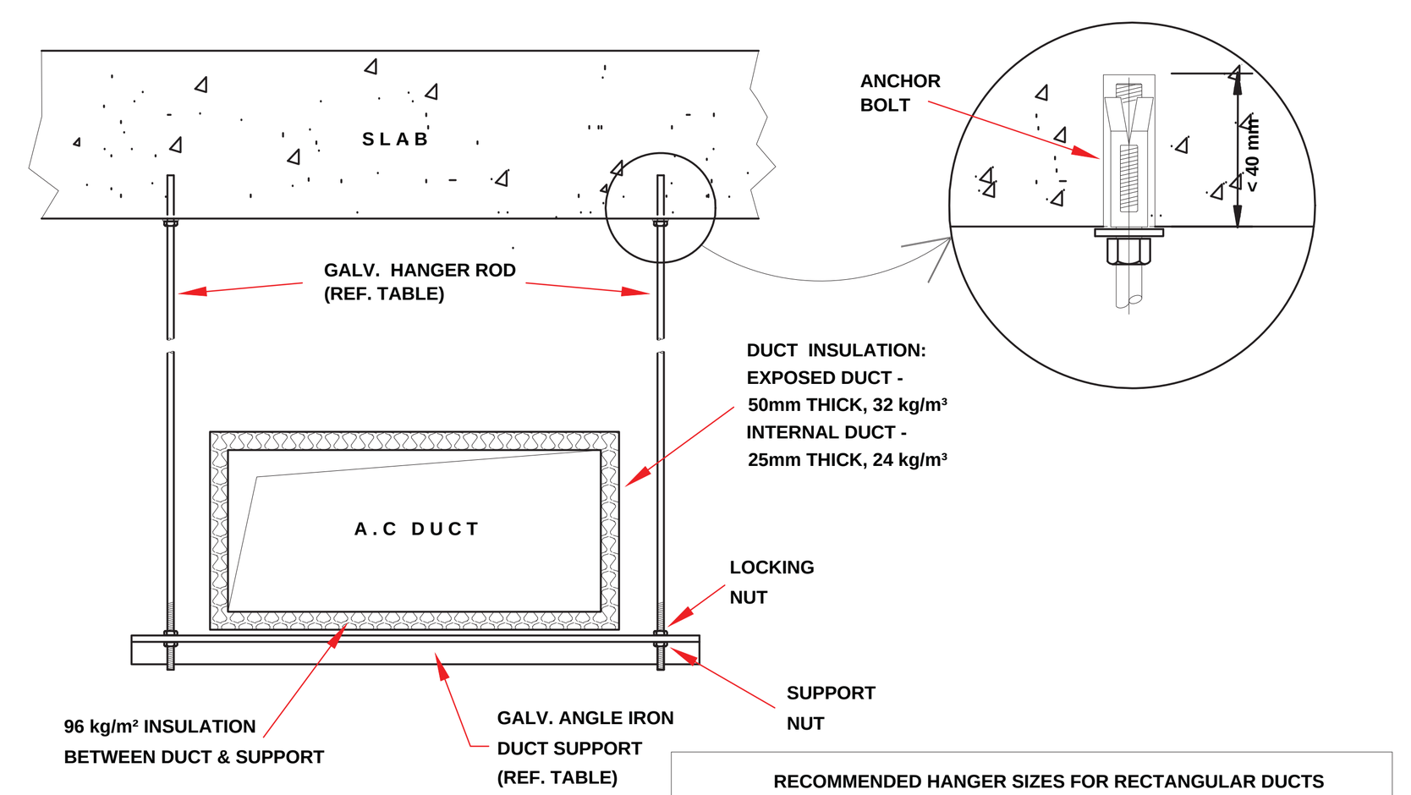
7 TYP. DUCT SPLITTING / BRANCH CONNECTION
N.T.S



MINIMUM HANGER SIZES FOR ROUND DUCT

DUCT Ø (mm)	HANGER INTERVAL (mm)	HANGER ROD Ø (mm)
250	3000	6
450	3000	6
600	3000	6
900	3000	10
1250	2400	10
1500	2400	10
2100	2400	10

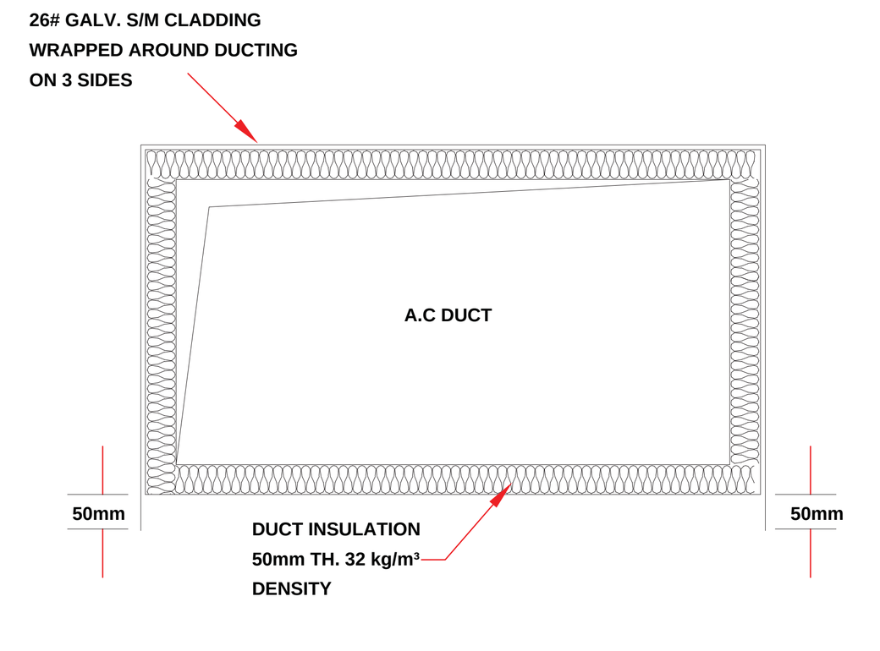
8 EXPOSED ROUND DUCT SUPPORT AND INSULATION
N.T.S



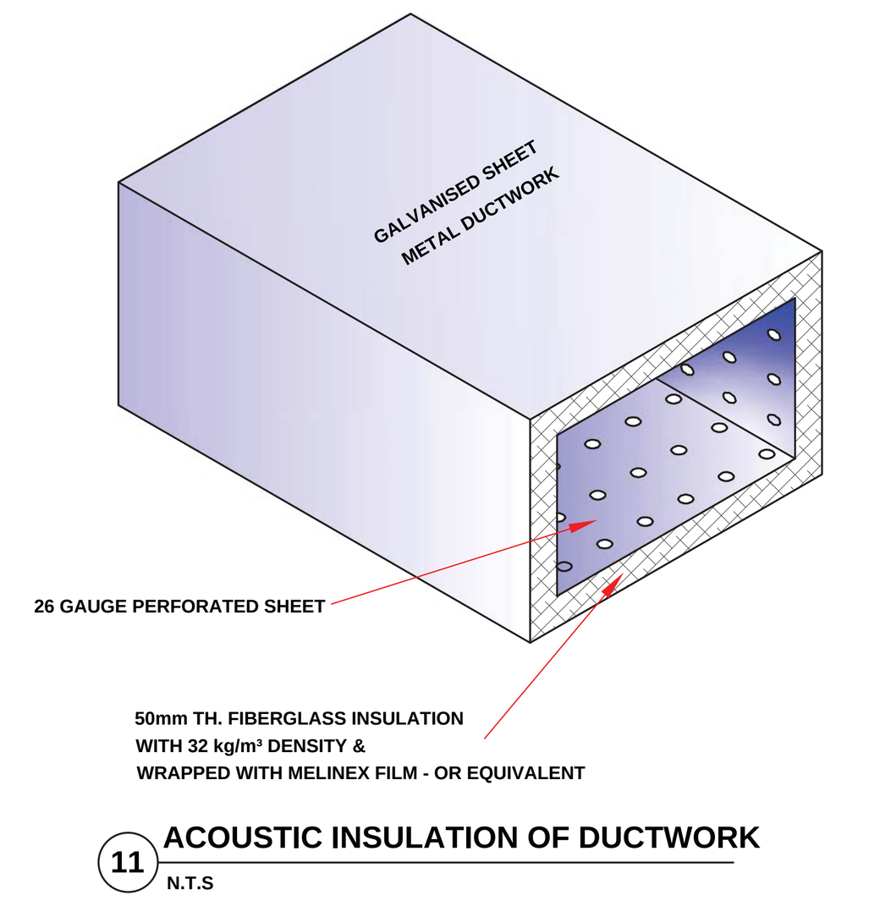
RECOMMENDED HANGER SIZES FOR RECTANGULAR DUCTS

LONGER DUCT DIMENSION (mm)	ANGLE IRON (SUPPORT)	HANGER ROD (mm)	GALV. STRAP HANGER (mm)	MAX. SPACING (mm)
UP TO 760	25x25x3	Ø6mm	25 x 1,6	3000
761 TO 1000	38x38x3	Ø6mm	25 x 1,6	3000
1001 TO 1200	50x50x3	Ø10mm	25 x 1,6	2400
2101 TO 2400	50x50x6	Ø10mm	25 x 1,6	2400
2401 AND OVER	50x50x6	Ø12mm	25 x 1,6	2400

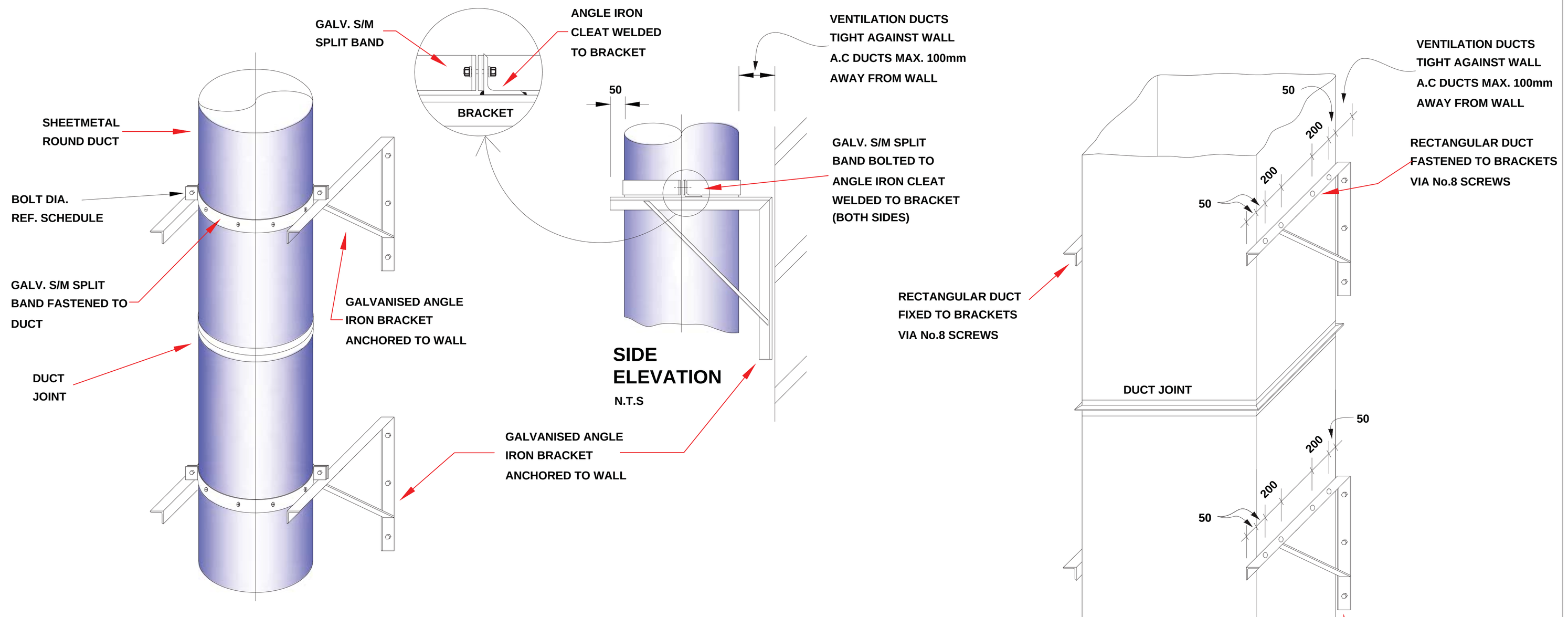
9 RECTANGULAR HORIZONTAL DUCT SUPPORT
N. T. S



10 EXPOSED DUCT CLADDING DETAIL
N.T.S



11 ACOUSTIC INSULATION OF DUCTWORK
N.T.S



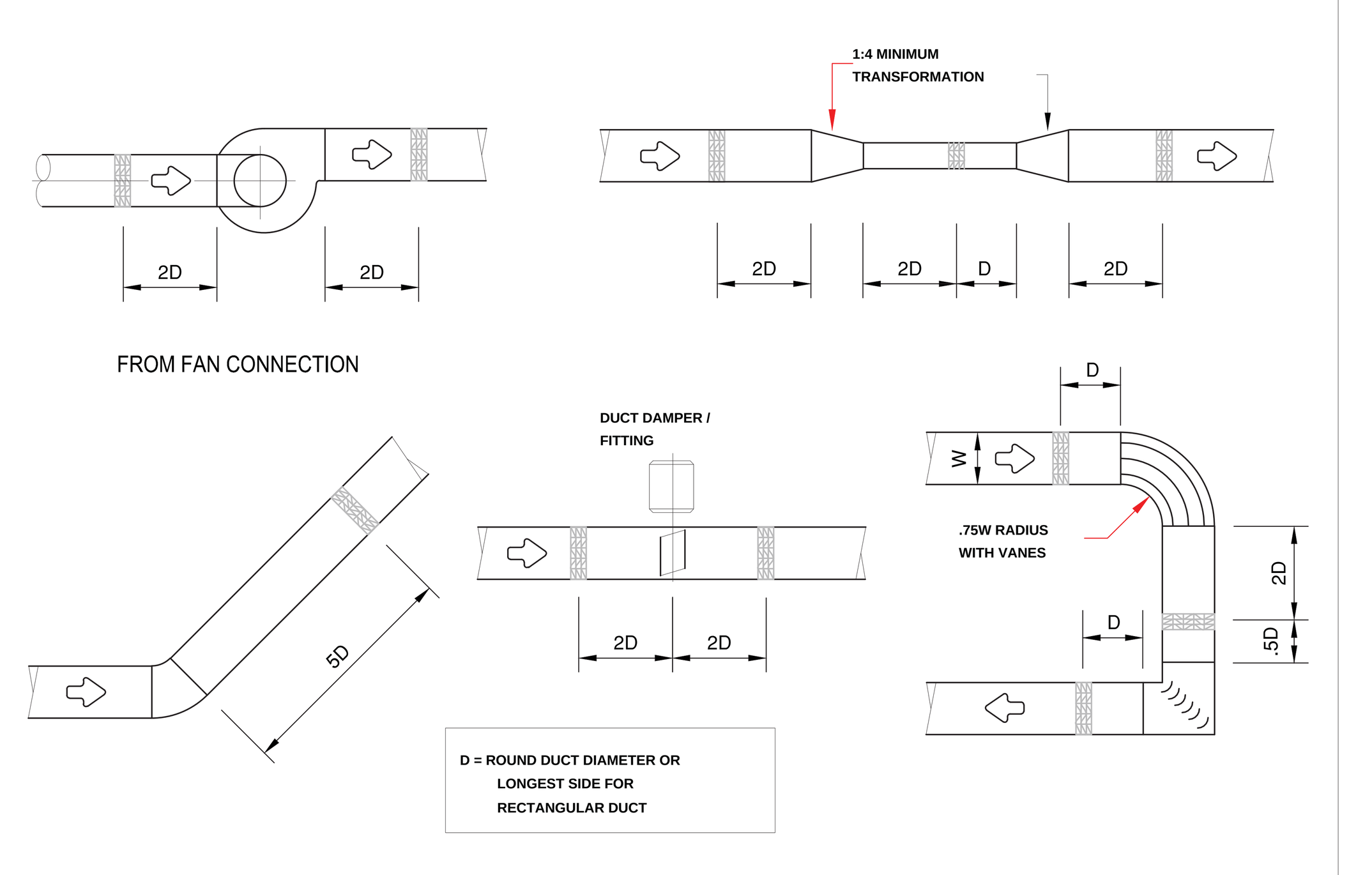
ANGLE IRON BRACKET SIZING

RECTANG. DUCT PERIMETER	Ø DUCT	ANGLE IRON (BRACKET)
1050 mm	< 680	25x25x3
1350 mm	680 TO 875	25x25x3
1650 mm	875 TO 1050	32x32x3
2150 mm	1050 TO 1250	32x32x3

SPLIT BAND SIZING

Ø DUCT	GALV. S/M BAND WIDTH	Ø BOLT
< 305	25mm (16#)	6mm
305 TO 600	25mm (16#)	6mm
600 TO 950	51mm (16#)	10mm
950 TO 1550	51mm (16#)	10mm

12 DETAIL OF DUCT RISER SUPPORT OFF WALL
N.T.S



13 AIR FLOW DUCT TRAVERSE READING POINTS
N.T.S

DUCTWORK MATERIAL SCHEDULE

AIR SYSTEM	MATERIAL
LOW PRESSURE SUPPLY	MILD STEEL GALVANIZED NOT LESS THAN 24#
RETURN	MILD STEEL GALVANIZED
GENERAL EXHAUST DUCT SYSTEM	MILD STEEL GALVANIZED
KITCHEN EXHAUST SYSTEM	CARBON STEEL (16# MIN.)
LAB EXHAUST SYSTEM	STAINLESS STEEL 316 (22# MIN.)
VAPOUR LADEN EXHAUST	ALUMINIUM (MIN 1.27mm) OR STAINLESS STEEL 316 (22# MIN.)
OUTSIDE AIR INTAKE/SUPPLY	MILD STEEL GALVANIZED

NOTES

THE CONTRACTOR SHALL APPLY S.M.A.C.N.A TABLE 1-5 FOR 500 Pa STATIC PRESSURE, OR LESS.

THE CONTRACTOR SHALL PROVIDE REINFORCEMENT IN ACCORDANCE WITH SELECTED GAUGES SHOWN.

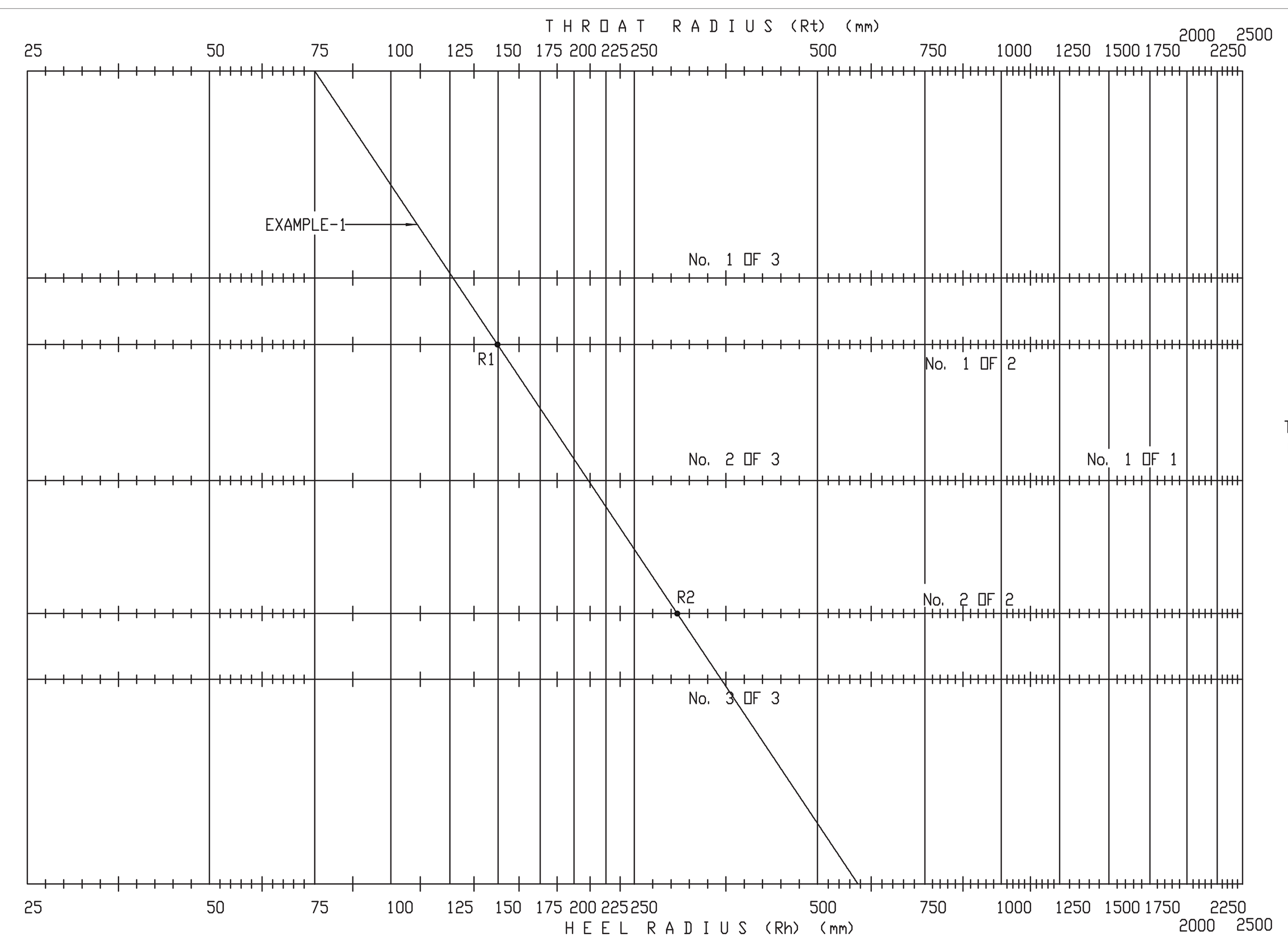
DUCTWORK PRESSURE CLASS SCHEDULE

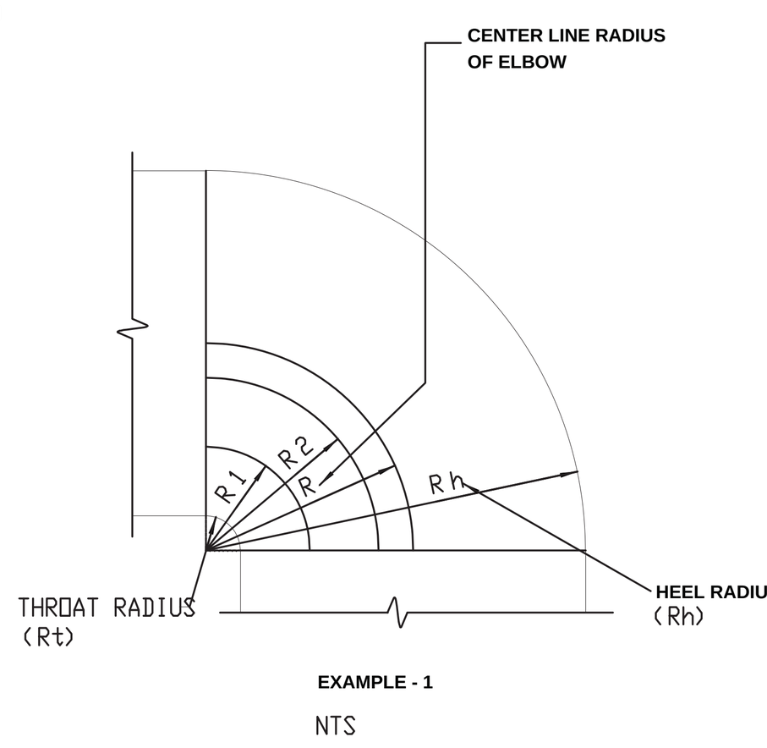
AIR SYSTEM	PRESSURE CLASS
AIR SUPPLY SYSTEM (FCU)	250 Pa
AIR SUPPLY SYSTEM (AHU)	500 TO 750 Pa
RETURN	250 Pa
RETURN AND RELIEF	250 Pa
KITCHEN EXHAUST	750 Pa
LAB EXHAUST	250 Pa
GENERAL EXHAUST	500 Pa
OUTSIDE AIR INTAKE/SUPPLY	500 Pa

STANDARD CONSTRUCTION FOR RECTANGULAR LOW PRESSURE DUCTS (500 Pa)

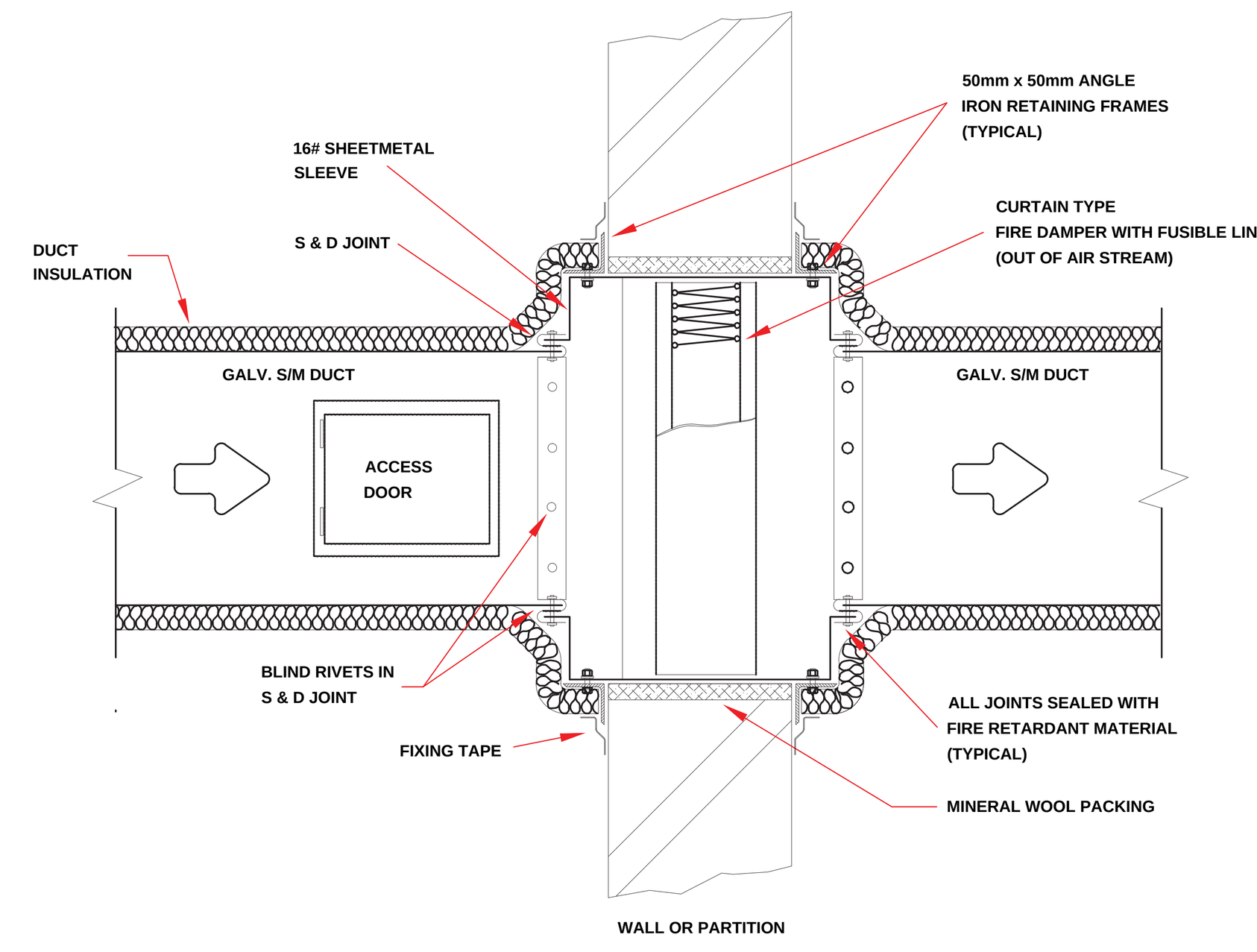
LONGER SIDE OF DUCT (mm)	SHEET METAL GAUGE (#)	MAXIMUM DISTANCE BETWEEN JOINTS (m)
≤ 300	24	2,4
300 TO 450	22	2,4
450 TO 750	22	2,4 OR 1,2
750 TO 1050	22	1,2
1050 TO 1350	22	1,2
1350 TO 1550	20	1,2
1550 TO 2150	20	1,2
2150 TO 2450	18	1,2

14 A.C DUCT THICKNESSES AND PRESSURES





15 VANE LOCATION FOR RECTANGULAR ELBOWS
N.T.S



ALL FIRE DAMPERS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA REGULATIONS

16 FIRE DAMPER DETAIL
N.T.S

MASTER
10 FEB 2017
AECOM TRANSNET

DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

NOTES

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REVISIONS

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	KC	JJ	AD	27-01-17

CONTRACTOR/CONSULTANT

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OPERATING DIVISIONS

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TRANSNET CAPITAL PROJECTS

TITLE	NAME	SIGN	DATE
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CHECKED	J.J.	[illegible]	27 01 17
DESIGNED	J.J.	[illegible]	27 01 17
CHECKED	A.D.	[illegible]	27 01 17

PR.ENG./PR.TECH./PR.ARCH

NAME	ANDREW DALLY	DATE
SIGNATURE	[illegible]	27 01 17
REG. NUMBER	9170004	
SCALE:	N.T.S.	A0

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TRANSNET

PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION N
STANDARD DUCTING DETAILS

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1 9 2 4 7 0 1	2	5 1 0	M	S T	0 0 0 6	0 1	0 0	AE

STANDARD PIPING NOTES

CHILLED WATER PIPE INSTALLATIONS

1. GENERAL

Refer to Project Technical Specification for specific details of piping installation.

Pipes, strainers and other fittings up to 50mm may be screwed or flanged.

Valves, strainers and other fittings larger than 50mm must be flanged.

Thread must be in accordance with BS 21 and flanges to ASA standard or BS 4504 unless otherwise specified.

Galvanised piping must be screwed when smaller than 50 mm and flanged above 50 mm.

Clean all piping before connecting.

Welding to galvanised piping or fittings is not permitted.

Where welding for whatever purpose is unavoidable the complete section must be hot dip galvanised after manufacture.

Cold galvanising is not acceptable.

Use full radius bends and sweep fittings wherever possible. Use elbows only under exceptional conditions

Where it is necessary to reduce pipes in size, use only reducing sockets and not bushes.

Provide all pipelines with 15mm drain cocks at all low points in the system so that the pipe work can be drained of liquid without dismantling.

Install horizontal pipes with a slope of at least 1 in 500 to allow venting of air to the expansion tank wherever possible. Fit all pipes in such a manner as to prevent the formation of air locks and air pockets. Provide high points with automatic air vent valves or air bottles. Air vents or bottles must be designed for at least 1,5 times the working pressure of the system.

Arrange piping in plant rooms so that normal inspection and servicing of equipment is not obstructed.

Size pipes which are not dimensioned on drawings using the following criteria:
- * The velocity must not exceed 2,5 m/s.
- * The friction rate must not exceed 60 kPA per 100m length.

Pipe expansion joints, where required, shall be of the bellows type manufactured from stainless steel or may be of the Viking Johnson pipe coupling or equal where moderate expansion movements are to be accommodated.

Chilled water piping shall be black medium tubing, conforming to SANS 62-1.
Screwed joints may be used for piping of diameter up to and including 50mm diameter whereas all piping in excess of this diameter shall be jointed by the welded process, using flanges where stated below.

Pipes of diameter in excess of 150mm shall be constructed of seamless black steel in accordance with SABS 62-1971 with welded joints only.

All black pipe fittings shall conform with SABS 509-1955.

Welding of pipework shall be carried out only by qualified welders and the Employer reserves the right to have cut for examination.

Connections to air handling units, pumps, chillers and other major equipment shall be flanged in the case of piping of diameter 65mm and over and shall be joined using cone face unions in the case of piping of diameter less than 65mm, to enable sections of the air conditioning system to be removed and replaced.

In all piping installations due allowance shall be made for the thermal expansion and contraction of the piping material.

The chilled water system and the hot water system shall each be supplied with expansion tanks of the asbestos or copper type each with a minimum water volume of 150 litres, complete with ball valve, quick-fill and drain connections.

Automatic air release valves shall be fitted at the top of the riser pipe stacks, and in any other positions in the hot water, chilled water and condenser water systems where necessary to prevent airlocks and to facilitate commissioning of the pumping systems.

Condenser water pipes shall be of medium or heavy black steel piping to BS 1387 or SANS 719 specifications but shall be hot-dip galvanised after manufacture with a minimum coating of 300 g/m2.
Fittings shall be of heavy galvanised malleable steel or malleable iron with galvanising as above, and shall be manufactured to BS 1740 or SABS 509 specifications. Flanges shall be of cast iron or steel to BS 4504 or ASA Standards and shall be galvanised.

Drain pipes must fall with a gradient of 1:50.

Provide all drain pipes with cleaning eyes at each change in pipe direction. .

Domestic grade copper piping could be used for drain piping with elbows and fittings of the compression or solder type.

2. HANGERS AND SUPPORTS

Spring hanger mountings for vibration damping shall be used in all plant rooms.

Pipe hangers shall be adjustable in height to set the pipe gradient. .

The maximum horizontal support spacing and hanger rod diameters shall be as follows for steel chilled water, condenser water, hot water

Nominal Pipe size (mm)	Hanger Rod ø (mm)	Span (m)
12-32	6	2.5
40-65	10	3.0
80-100	12	3.5
125-150	16	4.0
200-300	22	5.0
350-500	25	6.0

The maximum horizontal support spacing for condensate (from AC units) pipes shall be as follows:

Nominal Pipe Size (mm)	Span (m)
12-20	1.0
25-40	2.0
50 and over	2.5

Hangers shall be provided at a maximum spacing of 1 metre from each elbow or pipe fitting.

3. VALVES

Valve materials shall be selected for the particular application.
For detailed valve specification refer to Project Technical Specification.
Saunders type valves or approved equivalent will be accepted.
Gate valves shall only be used as isolating or shut off valves.
Globe valves shall be used for throttling or balancing purposes.
Butterfly valves shall be used for isolating and shut off purposes.

Diaphragm valves shall only be used as shut-off purpose

Check valves shall be of the non-slam type for horizontal or vertical installation.

Plug cocks shall be used for balancing purposes.

Calibrated balancing valves shall be of the plug cock or globe type with bronze or cast iron valve bodies, bronze disc, internal seals, screwed ends, up to 50 mm and flanged ends for 65 mm ø and over. Valves shall be TOUR AGENTUR or approved equivalent.

4. STRAINERS

Strainers shall be of the angle or Y-type. Strainers up to 50 mm shall have screwed ends and strainers of 65 mm ø and above, shall have flanged ends.

Bronze or stainless steel screens will be acceptable.

Screens shall be perforated as follows:

Strainer Size (mm)	Perforation Size (mm)
10-50	1.0
65-150	1.5
200 and over	2.0

Strainers shall be provided with a 50mm blowdown pipe and cock on the cap piped to the nearest drainpoint. Flexible piping shall be used.

Strainers shall be installed on the inlet side of all hot water, chilled water and condenser water pumps.

5. GAUGES

Pressure gauges for water shall be of the Bourdon type and glycerine filled.
Pressure gauge dials shall have a diameter of at least 100 mm.
A gauge cock and siphon tube shall be provided with each gauge.

6. CONNECTIONS TO VIBRATING EQUIPMENT

Flexible connections shall be Mason Industries SAFEFLEX SFDEJ [double sphere type] or approved equivalent, which shall be provided to the suction and discharge pipes for chilled, condenser and hot water pumps.

7. TESTING OF PIPE INSTALLATIONS

All pipe fittings shall be tested hydrostatically up to a pressure of 1000 kPa or 1.5 times the maximum system pressure, whichever is the higher value.
Tests shall be carried out before the application of insulation.
Water systems shall be filled with water and air vented at least 24 hours before the test.
The test pressure shall be maintained for a period of at least 2 hours after the pressure testing pump has been disconnected.

8. FLUSHING/DRAINING

Upon the completion of all pressure tests throughout the building complex, and prior to the commencement of commissioning of pumping systems, the entire system shall be drained and flushed to ensure the removal of waste jointing material, accumulated dirt, and sundry construction materials.

Refer to Water Treatment section for method of cleaning and flushing a piping reticulation.

9. WATER TREATMENT

Refer to Project Technical Specification for specific details of "Water Treatment".

10. CHILLED WATER PIPEWORK INSULATION

All chilled water pipework, including pipe fittings and connections, shall be insulated with Polyisocyanurate (PIC) foam, with the necessary vapour barrier.
The insulation shall be applied as noted on the Detail Drawing.

Rigid preformed piping sections shall be used where applicable. Where not possible, Blocks/Batts shall be shaped to suit the pipe fitting, and securely wired/banded in position. All joints and voids shall be filled with mineral wool. The thickness of the insulation shall be maintained over the pipe fitting.

All piping shall be supported from the outside of the insulation as per Details shown. The compressive strength of the insulation shall be determined to ensure no flattening of the insulation (i.e the insulation must maintain it's thickness). Should the weight of the pipe, plus contents, cause the insulation to flatten, then either provide "saddles", or increase the density of the insulation over the bracket width.

REFRIGERATION PIPEWORK AND INSULATION

Refrigerant pipe work shall be installed on site in accordance with Project Technical Specification, and generally as shown on the Equipment layout drawings. All indoor and outdoor Refrigerant pipework shall be insulated and protected by sturdy covers against accidental damage, as needed.

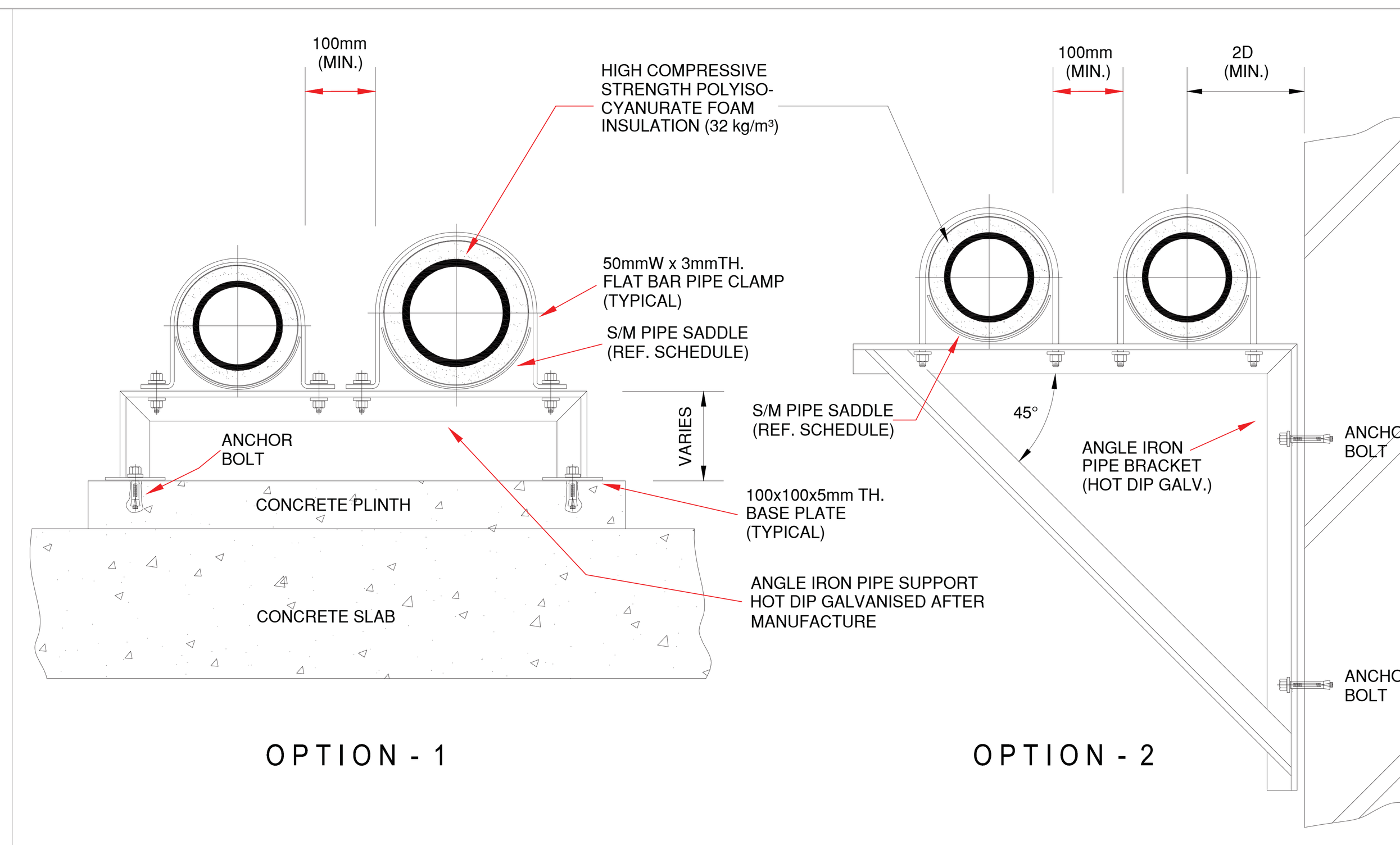
(i) Pipe Runs
- (a) Type-L copper to be used.
- (b) Horizontal pipes carrying vapour are to be sloped in the direction of the vapour flow.
- (c) Piping to be sized to ensure the correct Refrigerant velocities and pressure drops.
- (d) Liquid lines running over exposed roofs to be insulated.
- (e) All internal Refrigerant pipework shall be insulated with Armaflex, or approved equal.
- (f) All external Refrigerant pipework shall be insulated with 25mm thick rigid, pre-formed fibreglass sections of 48 kg/m² density.
- (g) All external Refrigerant pipework shall be vapour-sealed and cladded with Aluminium sections, or approved equal.
- (h) Refer to "Typical Refrigerant Piping Diagram" detail below.
- (i) All Refrigerant pipe runs / lengths to be in accordance with Supplier Requirements.
- (i) All Refrigerant pipes to run in cable trays. When external to the Building, a protective cover must be fitted.

(ii) Oil Traps
- (a) To be fitted at the bottom of all risers.
- (b) To be fitted every 7 metres up a riser.
- (c) No traps near the suction inlet of a compressor.

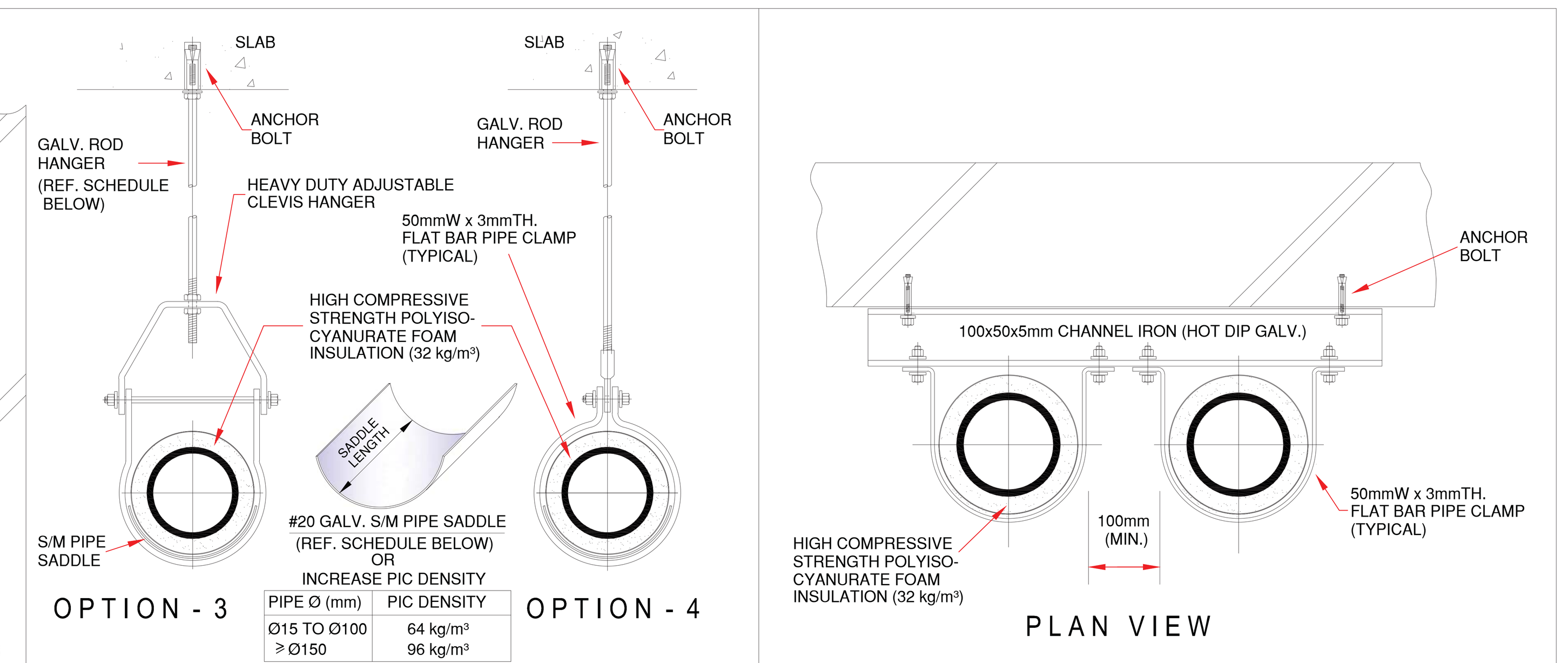
(iii) Before starting a system ensure that the Pipework is clean, and free of Contaminants.
- (a) Contaminants: Air, Moisture, Copper Oxide, Metal chips and dirt.
- (b) Contaminants will cause Compressor failure.
- (c) Purge system with dry Nitrogen.
- (d) Draw a vacuum.

(iv) Oil return to Compressor
- (a) Oil travels with the Refrigerant around the system.
- (b) Excessive lengths of pipework is detrimental to oil return to the Compressor.
- (c) After start-up of the system, check Compressor oil level, and top up if necessary.
- (d) Should the pipe lengths be run beyond the Manufcturer's recommendations, then topping up of Compressor oil is necessary.

(v) Suction line Accumulator
- (a) Required to prevent Liquid flooding back to the Compressor, after the system is shut down.
- (b) Systems which have excessive lengths of pipe, and fitted with "Capillary tube metering devices" must be fitted with an Accumulator.
- (c) Suction Accumulator to either be part of the Condensing unit, or fitted within the Suction line.
- (d) Suction Accumulator must be correctly sized.



1 HORIZONTAL CHILLED / HOT WATER PIPE SUPPORTS
N.T.S



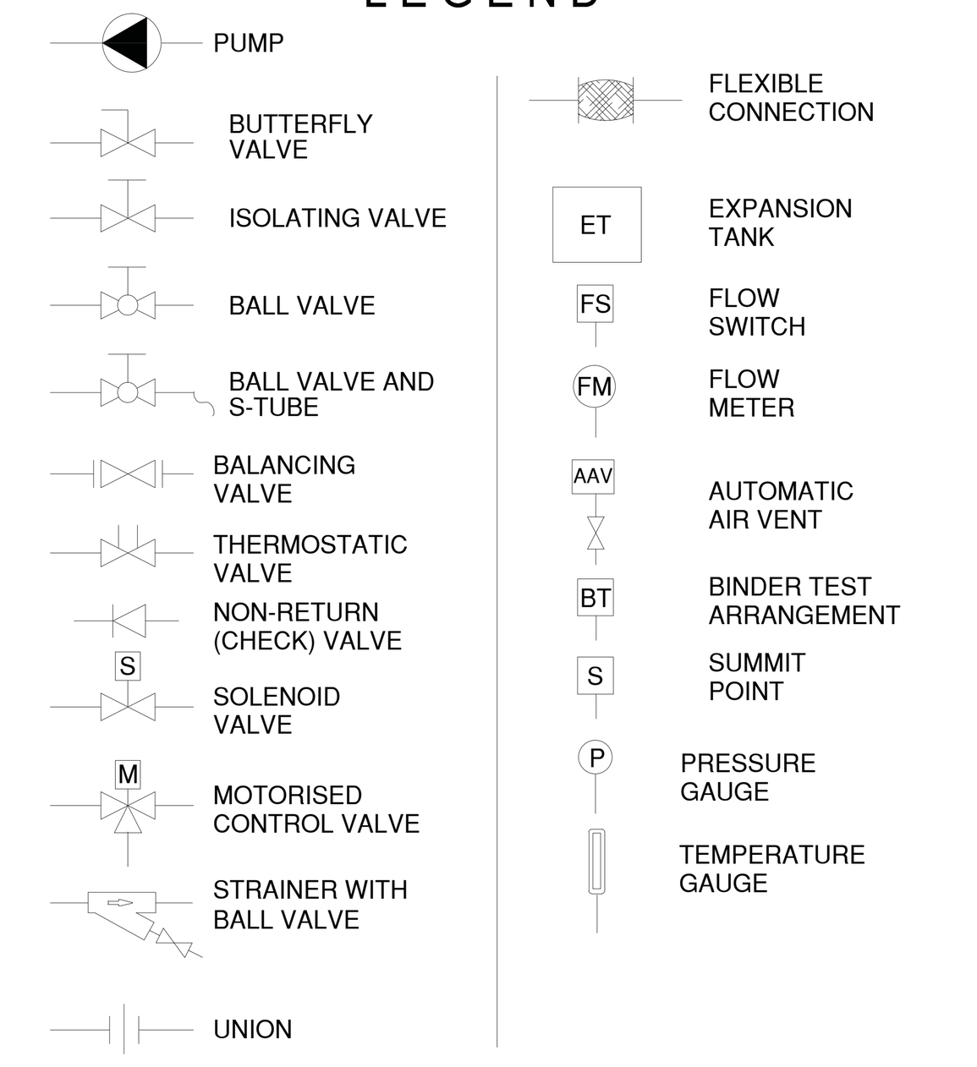
PIPE Ø (mm)	PIC DENSITY
Ø15 TO Ø100	64 kg/m³
⩾Ø150	96 kg/m³

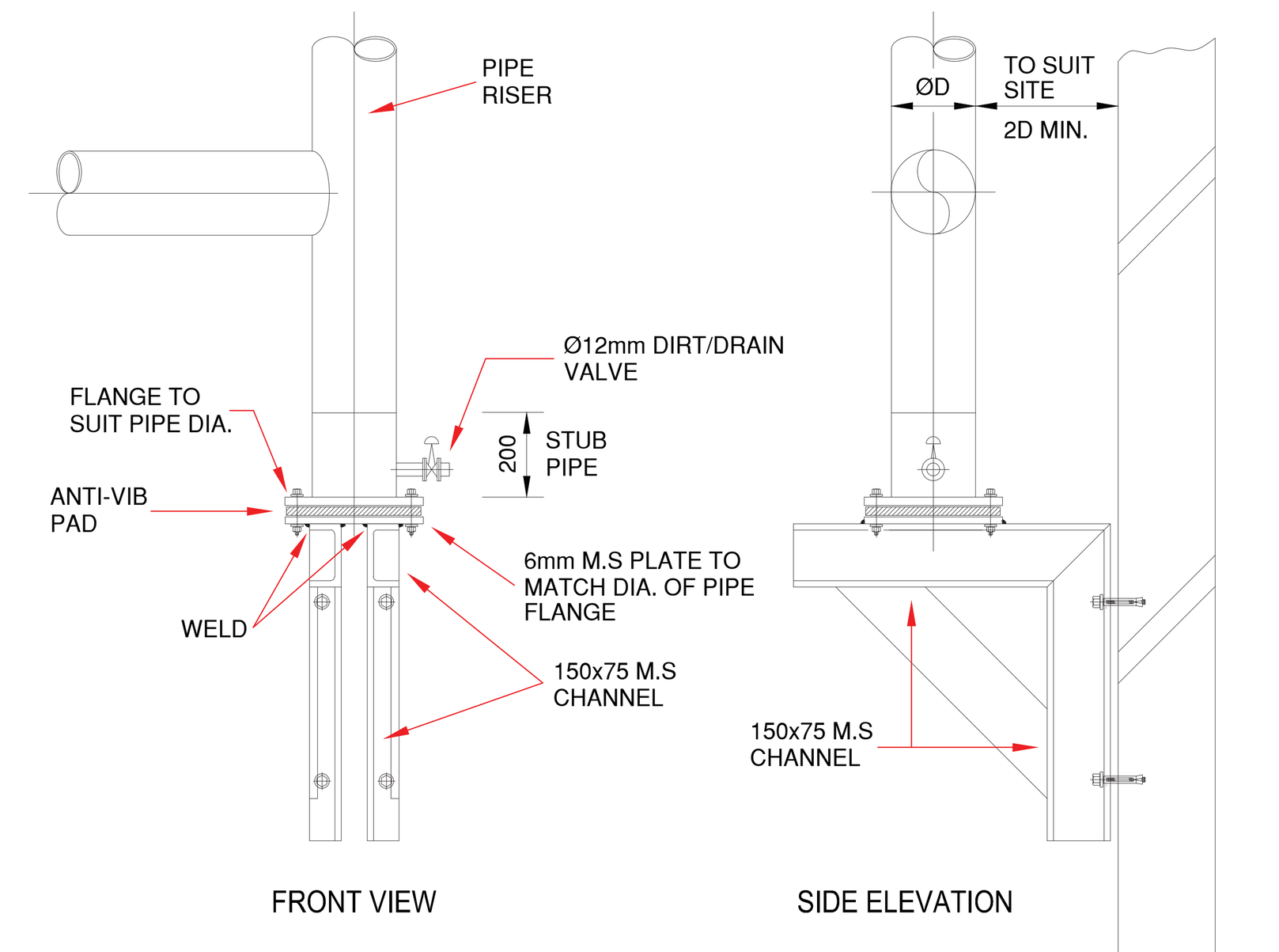
MINIMUM SADDLE LENGTHS FOR USE WITH 32 kg/m³ POLYISOCYANURATE (PIC) FOAM INSULATION (13mm TO 75mm THICK)

NOMINAL PIPE Ø (mm)	HANGER SPACING (mm)								
	1200	1500	1800	2100	2400	2700	3000	3300	3700
80	100	100	100	100	100	100	100	100	150
100	100	100	100	150	150	150	200	200	200
150	150	150	150	150	200	200	200	200	200
200	200	200	200	200	200	200	200	200	300
250	200	200	200	300	300	300	300	300	300
300	200	200	300	300	300	300	300	300	300
400	300	300	450	450	450	450	450	450	450

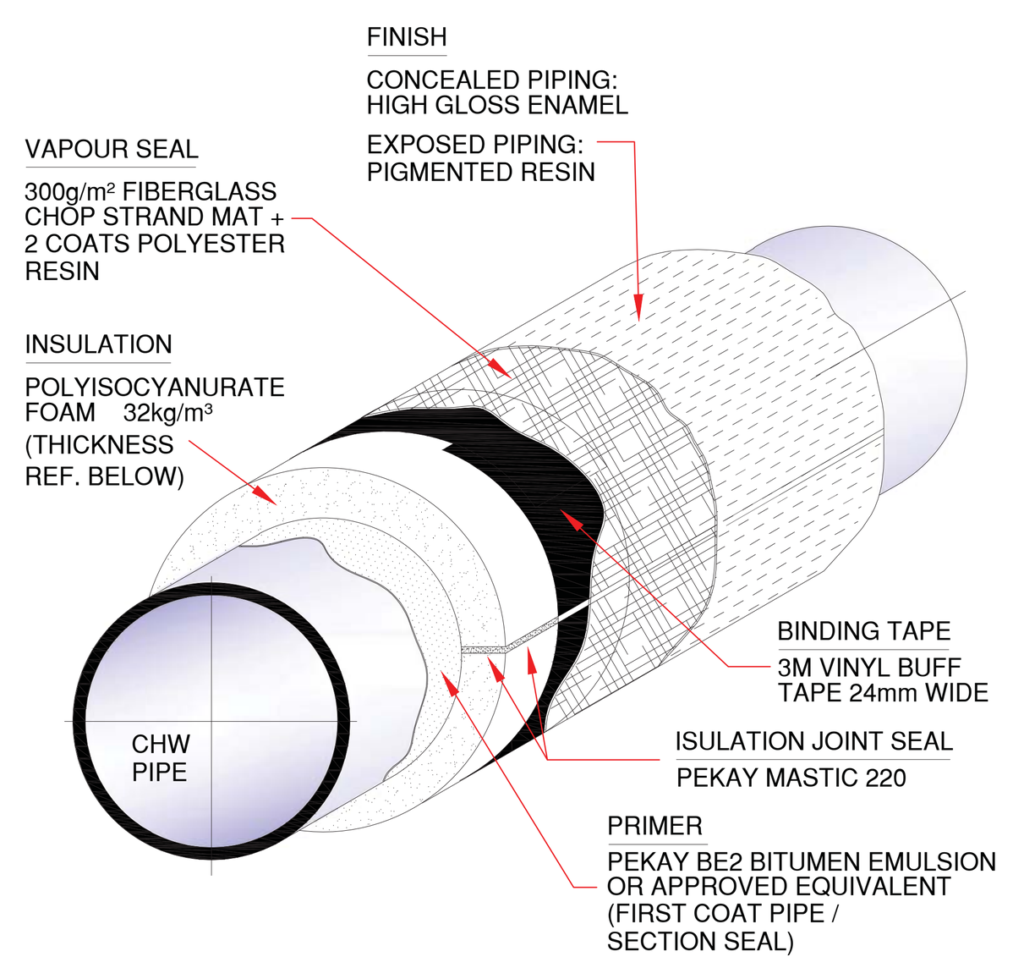
2 VERTICAL CHILLED / HOT WATER PIPE SUPPORTS
N.T.S

LEGEND





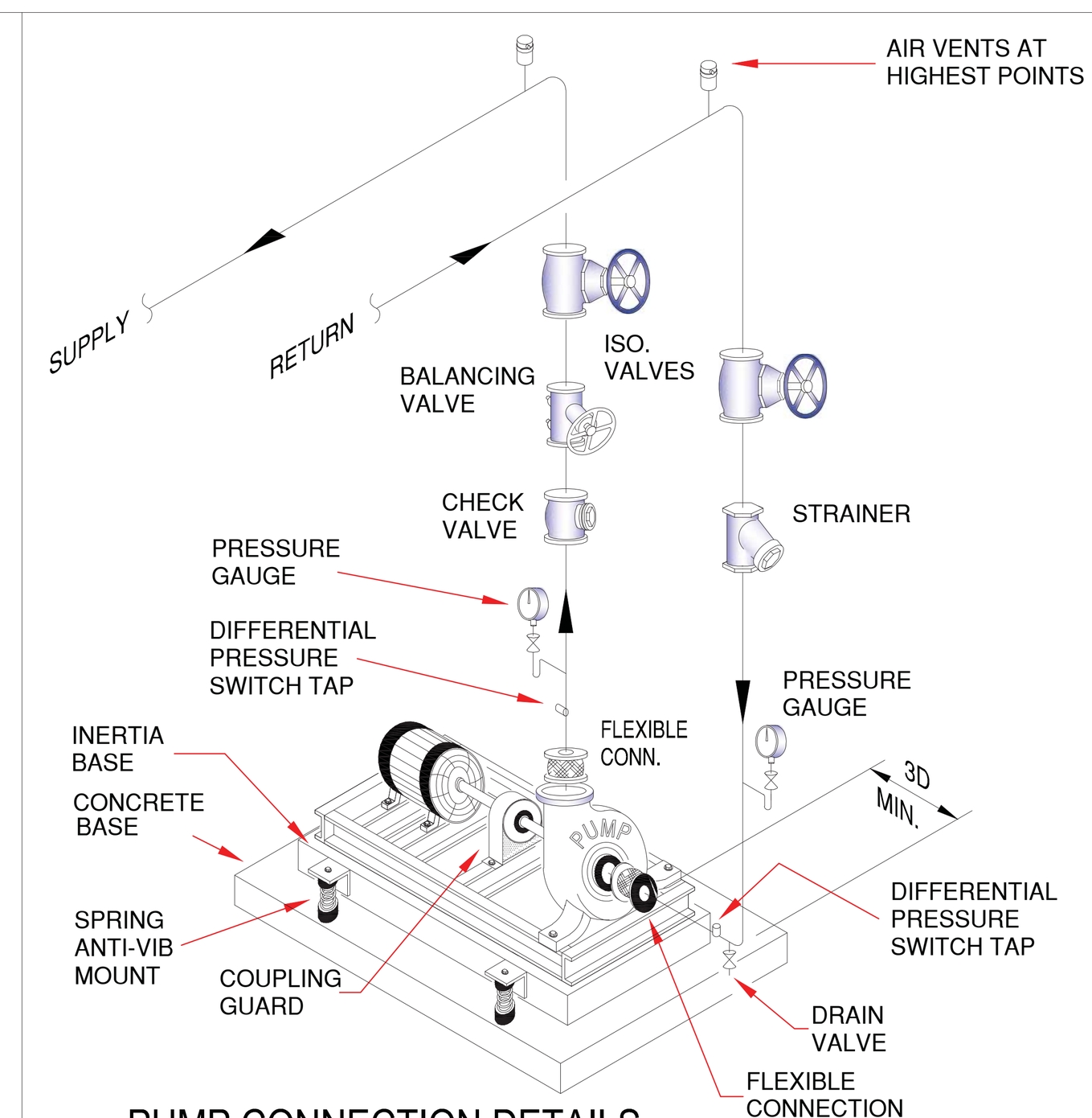
3 RISER SUPPORT AT BOTTOM
N.T.S



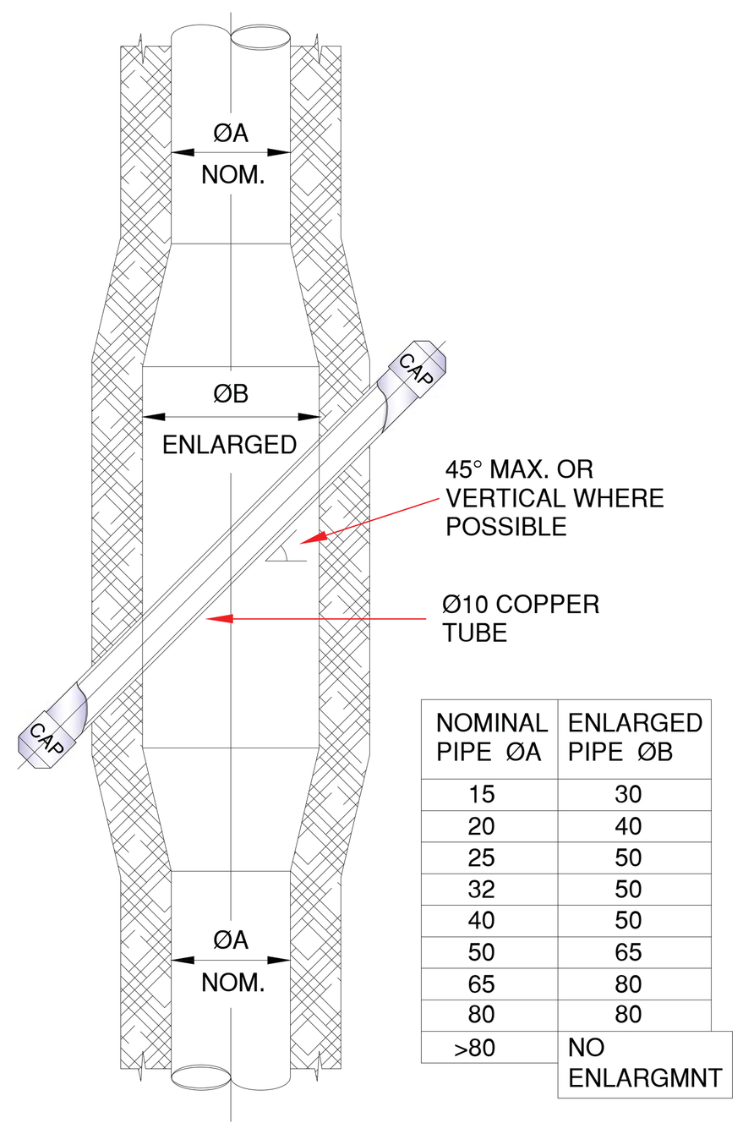
INSULATION THICKNESS

PIPING WITHIN BUILDINGS		EXPOSED PIPING	
Ø PIPE (mm)	INSULATION THICKNESS (mm)	Ø PIPE (mm)	INSULATION THICKNESS (mm)
15 TO 80	25	15 TO 65	25
⩾Ø100	50	⩾Ø80	50

4 CH. WATER PIPE INSULATION DETAIL
N.T.S

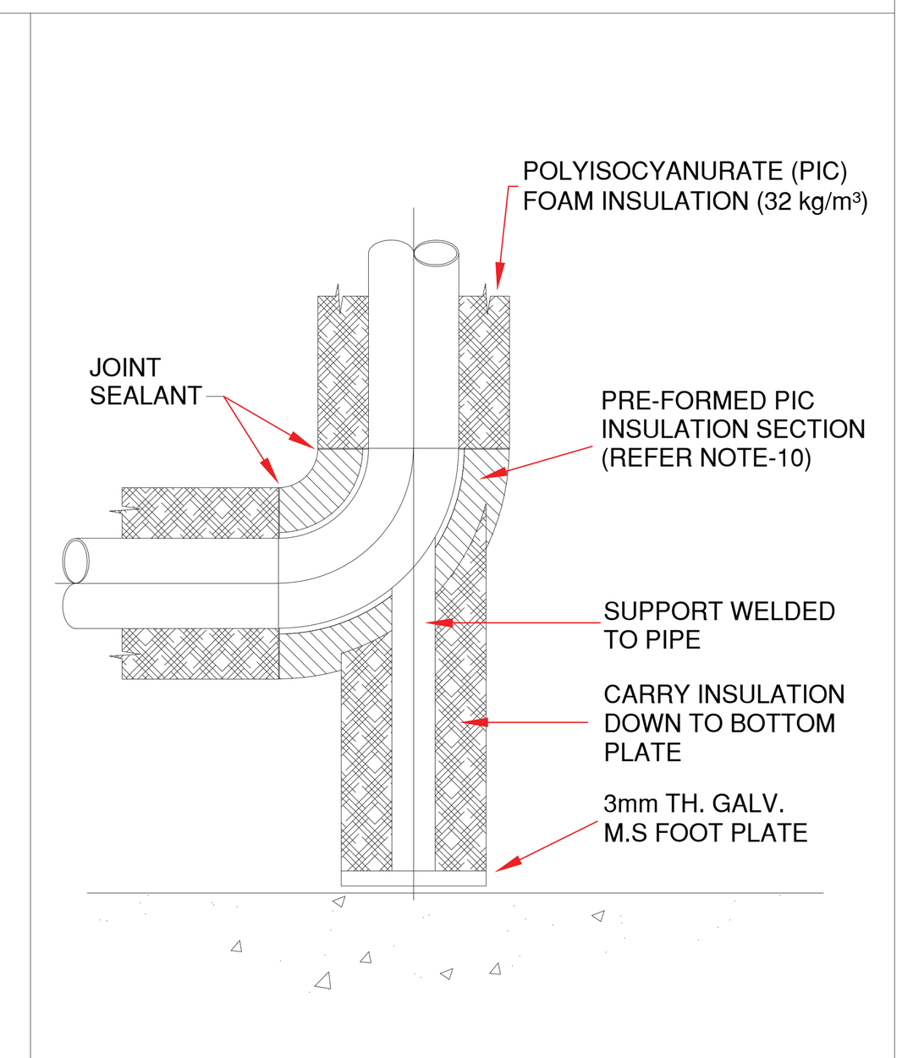


5 PUMP CONNECTION DETAILS
N.T.S

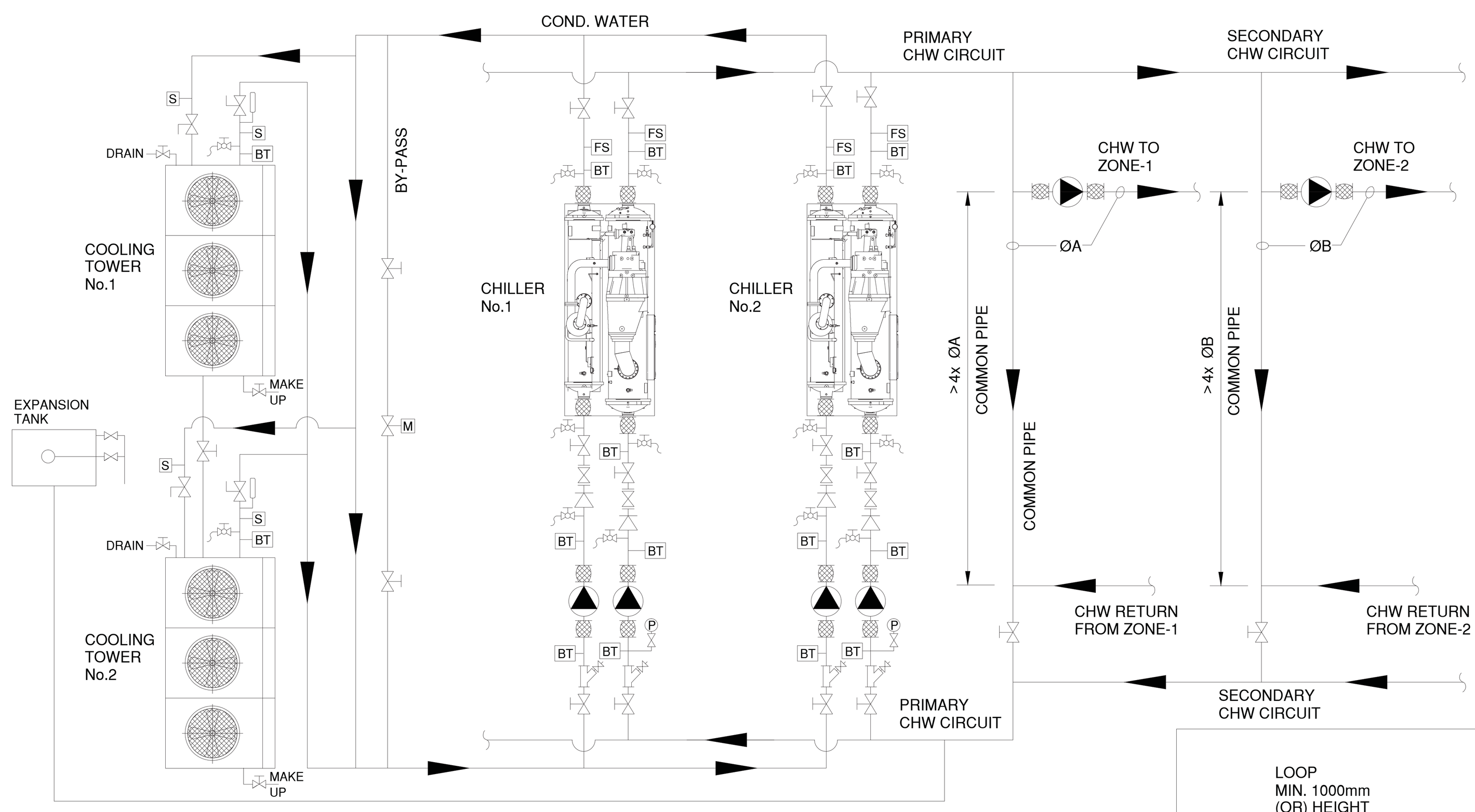


NOMINAL PIPE ØA	ENLARGED PIPE ØB
15	30
20	40
25	50
32	50
40	50
50	65
65	80
80	80
>80	NO ENLARGMNT

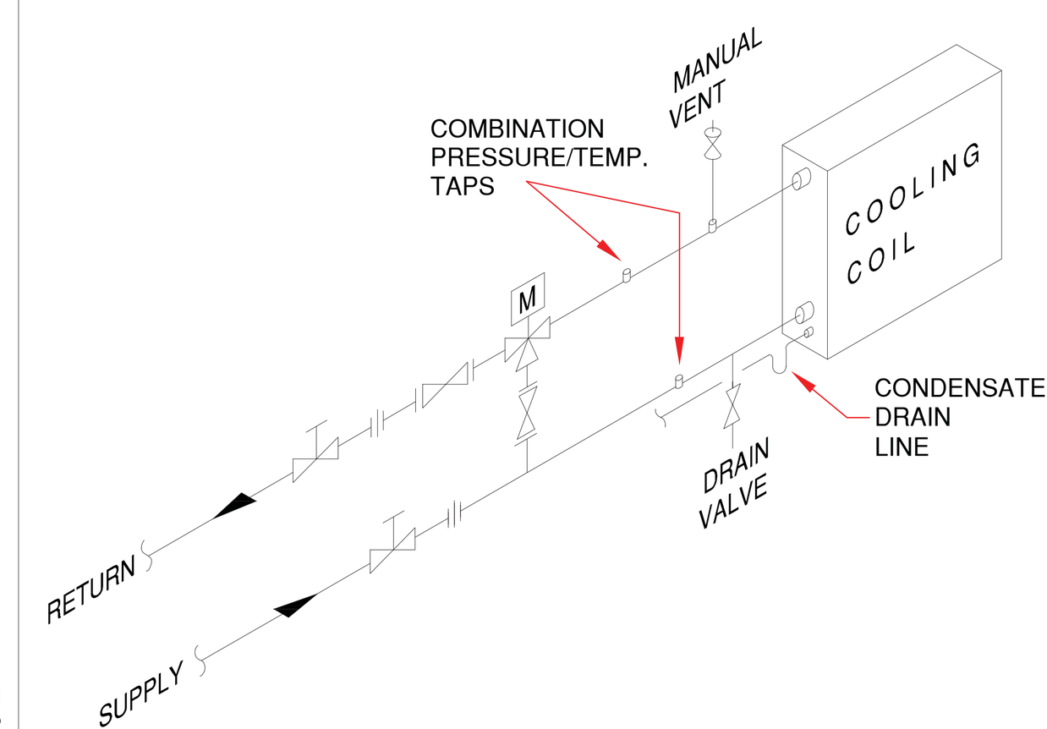
6 TEST THERMOMETER POCKET
N.T.S



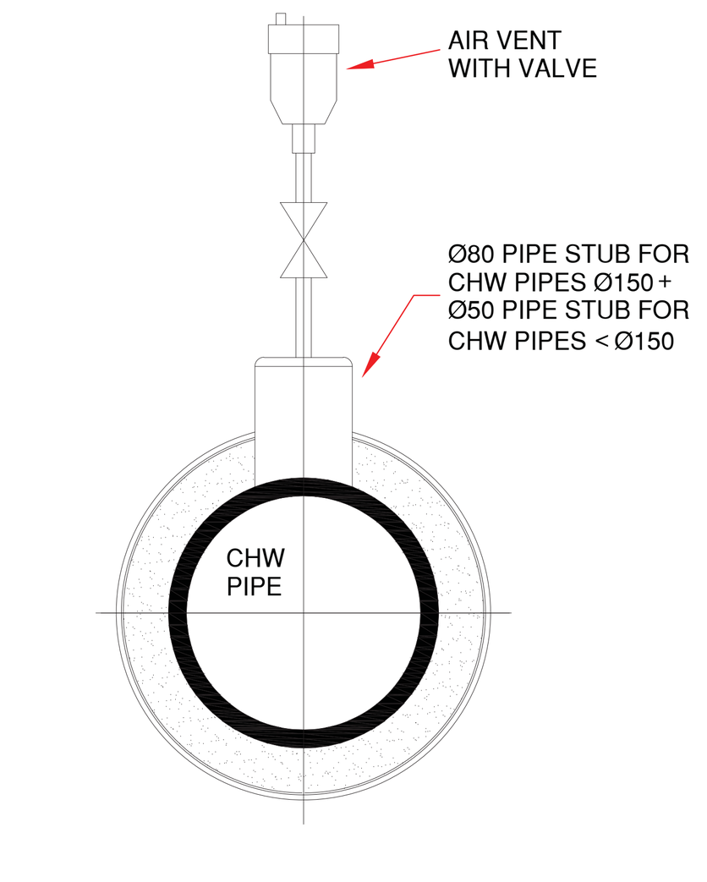
7 PEDESTAL SUPPORT AT ELBOW
N.T.S



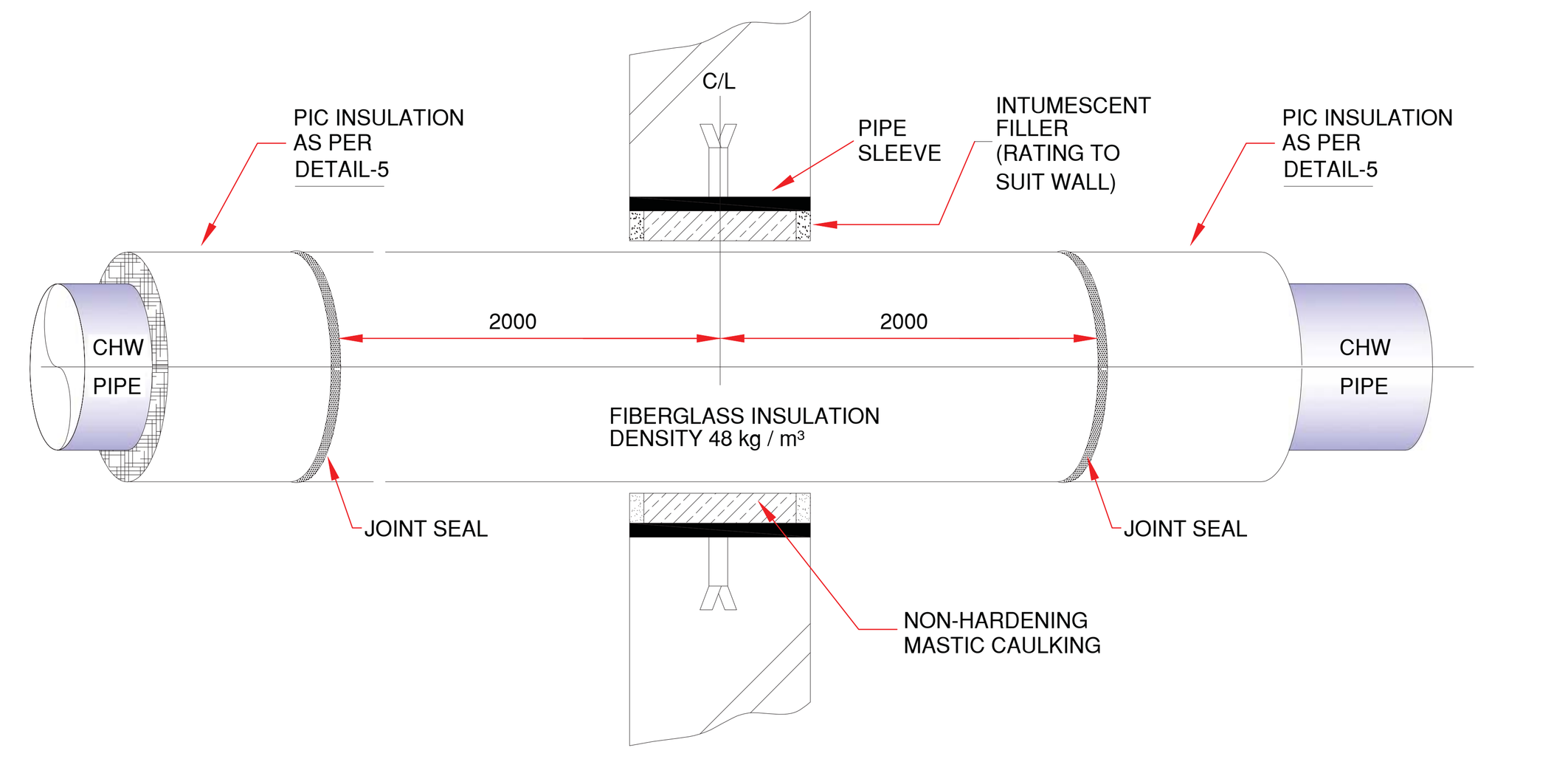
8 TYPICAL CHW AND COND.WATER PIPING SCHEMATIC
N.T.S



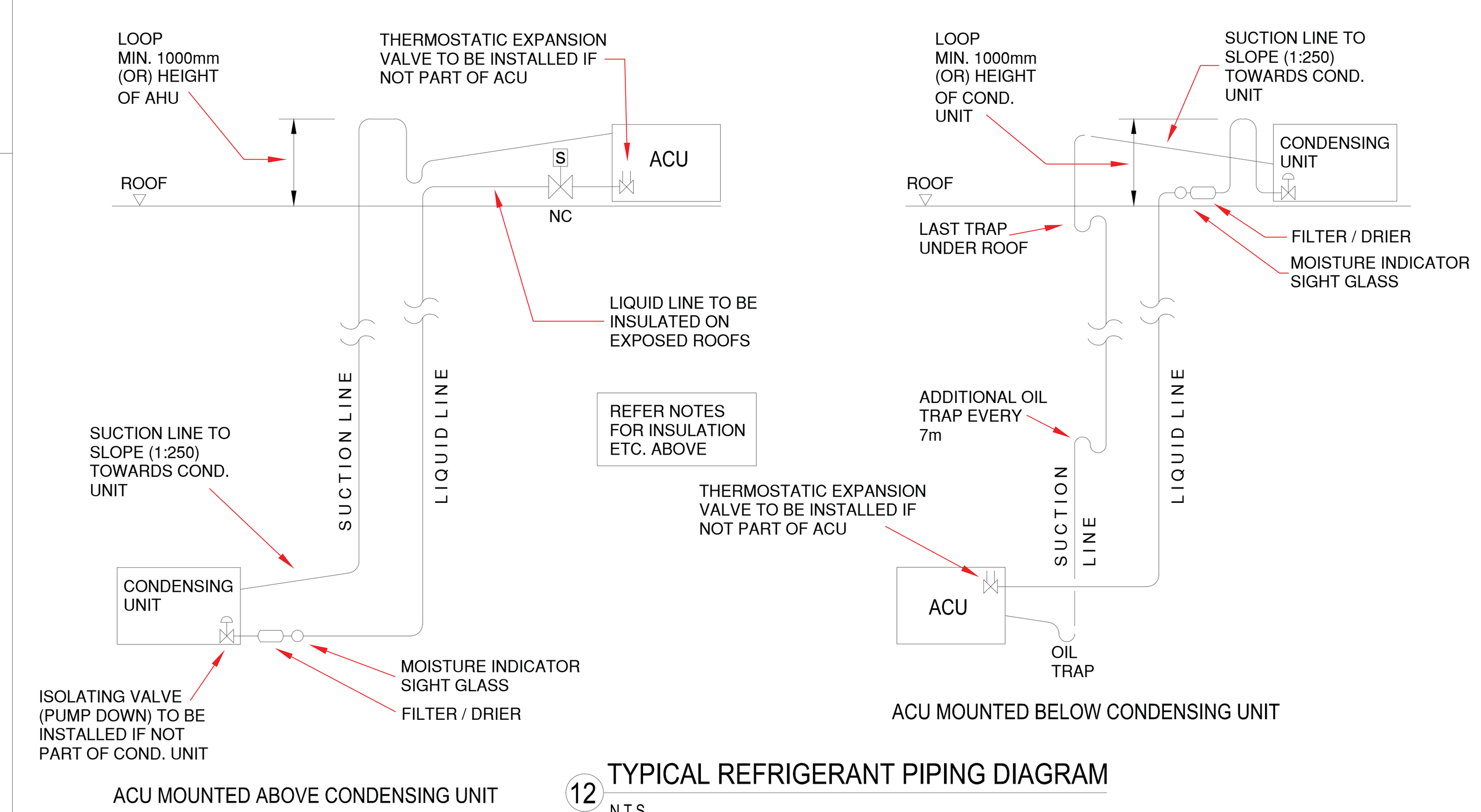
9 TYPICAL COOLING COIL PIPING SCHEMATIC
N.T.S



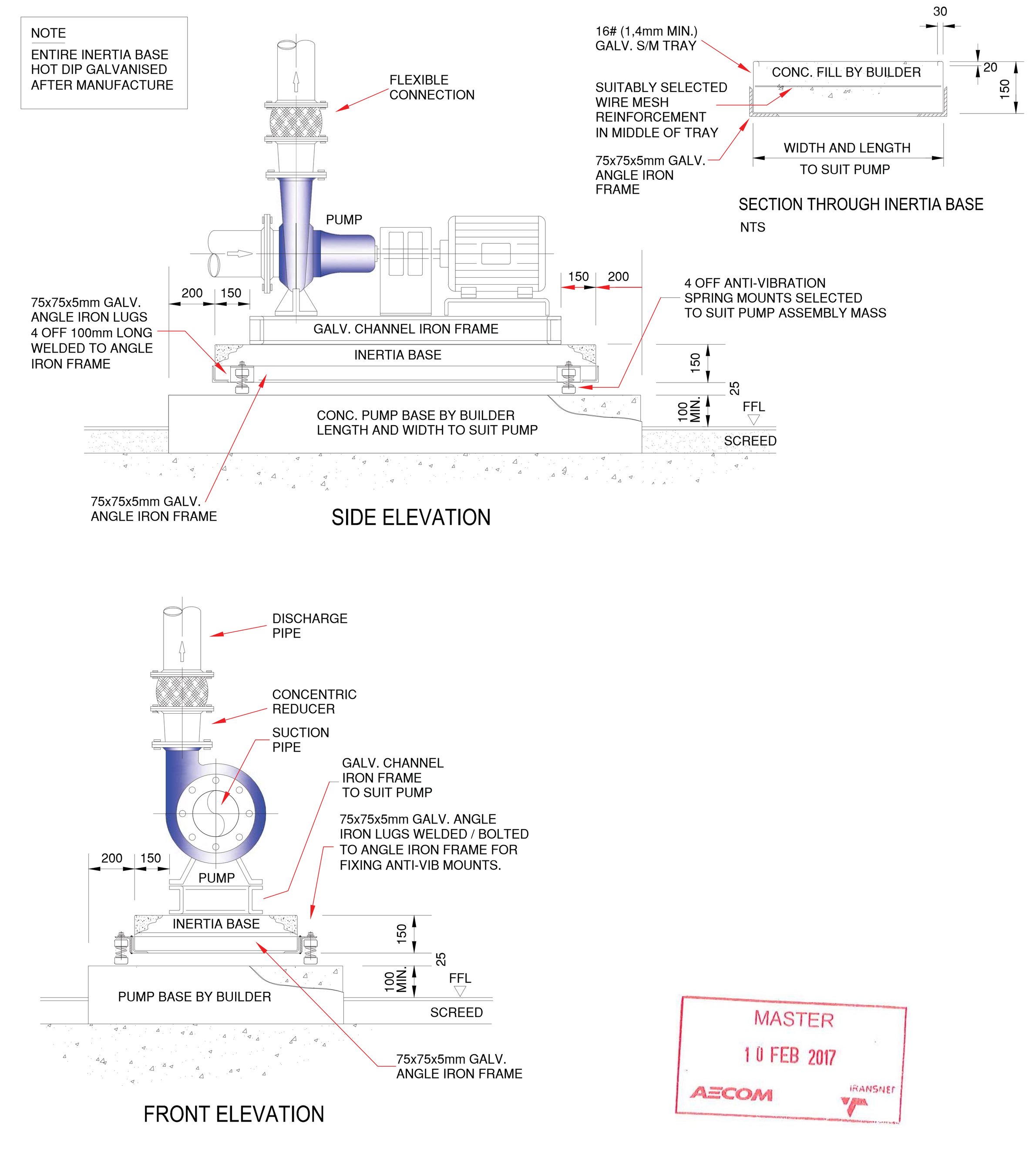
10 AIR VENT DETAIL
N.T.S



11 DETAIL OF CHW PIPE THROUGH FIRE-RATED WALL
N.T.S



12 TYPICAL REFRIGERANT PIPING DIAGRAM
N.T.S



13 PUMP INERTIA BASE DETAIL
N.T.S

DRAWING NO.	REFERENCE

REFERENCE DRAWINGS

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TRANSNET

PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
SUBSTATION N
STANDARD PIPING DETAILS

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1 9 2 4 7 0 1	2	5 1 0	M	S T	0 0 0 7	0 1	0 0	AE

STANDARD DUCTING NOTES

THIS IS A GENERIC LEGEND AND NOT ALL ITEMS MAY BE APPLICABLE TO THIS SPECIFIC HVAC CONTRACT.

1. THE ENTIRE HVAC SYSTEM TO COMPLY WITH THE PROJECT TECHNICAL SPECIFICATION, WHICH THIS DRAWING FORMS PART OF.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE INDICATED. SIZES SHOWN FOR THE DUCTS ARE CLEAR INTERNAL DIMENSIONS.
3. CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF ANY WORKS. ANY DISCREPANCY TO BE REPORTED TO THE EMPLOYER.
4. ALL HEATING, VENTILATION AND AIR CONDITIONING DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL NOTES AND SPECIFICATION, AS ISSUED BY AECOM, AND RELEVANT ARCHITECTURAL, ELECTRICAL AND STRUCTURAL DRAWINGS.
5. CAPACITIES, DIMENSIONS AND LOCATIONS OF HEATING, VENTILATION AND AIR CONDITIONING EQUIPMENT ARE BASED ON EQUIPMENT MODELS INDICATED IN HVAC EQUIPMENT CATALOGUES, SCHEDULES AND DRAWINGS.
6. ACCESS TO ALL HVAC EQUIPMENT AND ACCESSORIES SHALL BE AS PER DRAWINGS AND MANUFACTURERS' REQUIREMENTS.
7. ALL WATER PROOFING OF PENETRATIONS AND COUNTER FLASHINGS TO BE DONE BY SPECIALIST SUB-CONTRACTOR, TO BE APPOINTED BY CONTRACTOR.
8. STATIC PRESSURES FOR ALL THE FANS MUST BE VERIFIED PRIOR TO ORDERING THE FANS.
9. ALL THE TOILET DOORS TO BE UNDERCUT 25mm, OR PROVIDED WITH DOOR GRILLES.
10. ALL MATERIALS EXPOSED TO THE AIRFLOW WITHIN THE CEILING CAVITY PLENUM SHALL BE NON-COMBUSTIBLE OR LIMITED COMBUSTIBLE, WITH A MAXIMUM SMOKE DEVELOPMENT INDEX OF 50.
11. FINAL LOCATIONS & DIMENSIONS OF CONCRETE UPSTANDS FOR THE HVAC EQUIPMENT AND HVAC PIPING SHALL BE CHECKED ON SITE TO SUIT HVAC EQUIPMENT SPECIFIED.
12. ALL THE EXTERNAL SUPPORT BRACKETS, SHALL BE HOT DIP GALVANISED BEFORE INSTALLATION.
13. WHERE DUCTS AND PIPES PASS THROUGH WALLS, SLEEVES SHALL BE PROVIDED, AND SEALED WITH AN APPROPRIATE FIRE RATED SEALANT TO PROVIDE AN AIR-TIGHT INSTALLATION.
14. ALL EQUIPMENT DUTIES ARE GIVEN AS RATED DESIGN DUTIES WITH AIR VOLUMES CORRECTED FOR SITE ELEVATION ABOVE SEA LEVEL.
15. DIRECTION ARROWS AND IDENTIFICATION BANDS ARE TO BE PLACED EVERY TWO METER INTERVALS OVER THE INSULATION FOR ALL SERVICES.
16. ALL BENDS / ELBOWS WHICH HAVE A THROAT RADIUS LESS THAN 3/4 OF THE HEEL RADIUS MUST BE VANED. REFER TO CHART BELOW.
17. ALL AIR DIFFUSION EQUIPMENT SHALL BE SELECTED AND INSTALLED AS PER THE SUPPLIERS' DETAILED SPECIFICATIONS, AND ALL BRANCH DUCTS / CONNECTIONS TO AIR DIFFUSERS TO BE FITTED WITH DUCT BALANCING DAMPERS, AS SHOWN ON DRAWINGS.
18. ALL AIR CONDITIONING DUCTWORK TO BE LAGGED WITH RIGID FIBERGLASS SLAB COVERED WITH REINFORCED ALUMINIUM FOIL, AND FINISHED WITH A VAPOUR SEAL BARRIER:
    - 25mm THICK FIBERGLASS FOR INTERNAL DUCTWORK @ 24 kg/m³
    - 50mm THICK FIBERGLASS FOR EXTERNAL DUCTWORK @ 32 kg/m³, AND FINISHED WITH A WATER PROOF BARRIER.
    - HARD INSULATION UNDER SUPPORTS. (REFER DETAIL-10)
19. ALL THE SUPPLY SLOT DIFFUSERS & RETURN SLOT DIFFUSERS SHALL BE SIMILAR TO TROX TYPE - ALS OR APPROVED EQUIVALENT.
20. FINAL LOCATION OF ALL AIR DIFFUSION EQUIPMENT SHALL BE CO-ORDINATED WITH THE CEILING TILES, LIGHTING FIXTURES AND OTHER CEILING FIXTURES ON SITE.
21. FLEXIBLE DUCT TO ANY AIR OUTLET SHALL NOT EXCEED A LENGTH OF 1500mm, AND SHOULD BE STRAIGHT TO ACHIEVE MINIMUM AIR RESISTANCE AND NOISE.
22. ALL OUTSIDE AIR INTAKE OPENINGS SHALL BE PROVIDED WITH FILTERS UNLESS OTHERWISE NOTED ON THE HVAC DRAWINGS. OPENINGS TO BE MINIMUM 500mm ABOVE ROOF / GROUND LEVEL.
23. ALL DUCTWORK WORK RUNNING THROUGH HIGH HUMIDITY AREAS SHALL BE WRAPPED WITH 25mm THICK 32kg / m³ DENSITY FIBERGLASS INSULATION.
24. ALL THE OUTLETS FOR SUPPLY, RETURN, TRANSFER & EXHAUST AIR SHALL BE PROVIDED WITH VOLUME CONTROL DAMPERS. ALL DUCT CONNECTIONS FROM MAIN DUCTS TO BE PROVIDED WITH SPLITTER TYPE DAMPERS, OR AS OTHERWISE NOTED ON THE DRAWINGS.
25. ALL TRANSFER DUCTS SHALL BE PROVIDED WITH BACK DRAFT DAMPERS, IN ORDER TO PREVENT AIR FLOW IN THE OPPOSITE DIRECTION.
26. ALL AIR DIFFUSION EQUIPMENT SHALL BE EPOXY MATT WHITE, UNLESS SPECIFIED OTHERWISE.
27. FINAL SIZE OF ALL THE WEATHER LOUVRES DEPEND ON THE FAN SPECIFIED.
28. BACKDRAFT DAMPERS SHALL BE SIMILAR TO TROX TYPE - ARK OR APPROVED EQUIVALENT.
29. DUCTWORK AS NOTED IN MATERIAL SCHEDULE SHALL BE FABRICATED, CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH THE SMACNA STANDARD. THIS WILL INCLUDE PROVISION FOR ALL TEST POINTS TO ENABLE AIR BALANCING AND COMMISSIONING ACTIVITIES TO BE PERFORMED. (REFER TO DETAIL BELOW)
30. HINGED ACCESS DOORS SHALL BE PROVIDED ON THE LINK SIDE OF ALL FIRE DAMPERS AND CONTROL DAMPERS, AND GENERALLY AS RECOMMENDED BY THE SMACNA STANDARD.
31. FILTER SPECIFICATION
    PRIMARY AIR FILTER MATERIAL SHALL BE CAPABLE OF BEING WASHED AT LEAST 12 TIMES, AND HAVE AVERAGE ARRESTANCE OF 80% ACCORDING TO THE ASHRAE 52 / 76 STANDARD.
    SPARE FILTERS SHALL BE PROVIDED.
    FILTERS TO BE HOUSED IN PURPOSE-MADE FILTER HOUSINGS WITH AIRTIGHT ACCESS DOORS.
32. KITCHEN HOOD AND DUCT DETAILS
    a. THE HOOD SHALL BE CONSTRUCTED FROM AND BE SUPPORTED BY STAINLESS STEEL TYPE 430 NOT LESS THAN 1.2mm (OR) OF OTHER APPROVED MATERIAL OF EQUIVALENT STRENGTH, FIRE AND CORROSION RESISTANCE
    b. DUCTS SHALL BE CONSTRUCTED OF AND SUPPORTED BY CARBON STEEL NOT LESS THAN 1.37mm (16#) (OR) STAINLESS STEEL NOT LESS THAN 1.2mm (18#)
    c. ALL BEAMS AND JOINTS SHALL HAVE LIQUID-TIGHT CONTINUOUS EXTERNAL WELDS
    d. FIRE SUPPRESSION SYSTEM TO BE DONE BY SPECIALIST SUB-CONTRACTOR, TO BE APPOINTED BY CONTRACTOR.
    e. FIRE WALL SHALL BE 2-HOUR RATED TO ENCLOSE EXHAUST DUCT.
    f. FILTERS MUST BE "UL" CLASSIFIED, STAINLESS STEEL, NON-CLOGGING BAFFLE-TYPE, AND SHOULD BE EASILY REMOVABLE
    g. A RESIDUE TRAP SHALL BE PROVIDED AT THE BASE OF EACH VERTICAL RISER, WITH PROVISIONS FOR CLEANOUT
    h. AN OPENING, LARGE ENOUGH TO PERMIT CLEANING, SHALL BE PROVIDED AT EACH CHANGE IN DIRECTION OF THE DUCT, FOR THE PURPOSES OF INSPECTION AND CLEANING. SUCH OPENING SHALL BE AT THE SIDES OF THE DUCT AND AT EVERY TWO METER IN HORIZONTAL DUCTWORK.
    i. AFTER INSTALLATION OF FILTERS, THE REMAINING AREA OF THE HOOD TO BE CLOSED OFF
    J. KITCHEN EXHAUST DUCTS SHALL BE CONSTRUCTED IN COMPLIANCE WITH NFPA STANDARDS
33. MAIN HVAC ELECTRICAL POWER SUPPLY CABLE TO BE COPPER.
34. ALL HEATER BANKS TO BE HOUSED IN FLANGED STEEL CASINGS FOR EASY REMOVAL AND COMPLY WITH THE FOLLOWING SAFETY REQUIREMENTS:
    - AIR PRESSURE SWITCH / SAIL SWITCH
    - OVERHEAT THERMOSTAT WITH MANUAL RESET
    - BACK OF TERMINAL BOX TO BE INSULATED
    - ACCESS DOOR INTERLOCKED WITH HEATER BANK
    - HEATER ELEMENTS TO BE SIZED TO SUIT NUMBER OF STEPS AND BALANCE POWER OVER THE THREE PHASES
    - PROPORTIONAL OUTPUT CONTROL TO BE PROVIDED
    - HEATER ELEMENTS TO BE INCOLOY TYPE OR APPROVED EQUIVALENT & CHOSEN FOR "BLACK HEAT" OPERATION. (HEATING INTENSITY NOT MORE THAN 3 WATTS)
    - INSULATION SHALL BE 6mm THICK NON ASBESTOS MILL BOARD, LOCATED 300mm UPSTREAM AND 600mm DOWNSTREAM
35. ALL MACHINES AND MOTORS (ABOVE 0.75 KW) SHALL INCORPORATE THE FOLLOWING:-
    a. HIGH EFFICIENCY MOTORS (LOW COPPER AND IRON LOSSES)
    b. POWER FACTOR CORRECTION TO 0.95
    c. SPEED CONTROLLERS WITH VARIABLE / AUTOMATIC CONTROL VIA. BMS WITH 4 - 20 mA CONTROL (IF REQUESTED)
    d. ALL CONTROL TRANSFORMERS SHALL BE HIGH EFFICIENCY (LOW COPPER AND IRON LOSSES)
36. MOTOR POWER FOR ALL THE HVAC EQUIPMENT SHALL BE VERIFIED ONCE ORDERED
37. SOUND ATTENUATION
    a. ALL FACTORY-MADE SOUND ATTENUATORS TO BE SELECTED AND LOCATED AS PER THE "HOWDEN-DONKIN" COMPANY REQUIREMENTS.
    b. ALL SOUND ATTENUATORS TO BE LINED WITH MELINEX FILM, OR APPROVED EQUIVALENT.
    c. TRANSITION DUCTWORK BETWEEN ATTENUATORS AND AIR-CON UNITS TO BE PROVIDED WITH ACOUSTIC INSULATION AS PER DETAIL 11 ON THIS DRAWING.
    d. ALL DUCT LINING MATERIAL SHALL COMPLY WITH SABS STANDARDS.
    e. OCCUPIED ROOMS SHALL ATTAIN THE SOUND LEVELS AS NOTED IN THE ASHRAE APPLICATIONS HANDBOOK, CHAPTER - "SOUND AND VIBRATION CONTROL".
38. VIBRATION ISOLATION OF EQUIPMENT
    ALL ROTATIONAL EQUIPMENT WHICH HAS A POWER CONSUMPTION IN EXCESS OF 1kW SHALL BE FITTED WITH VIBRATION ISOLATORS TO ENSURE NO EQUIPMENT VIBRATION IS TRANSMITTED INTO THE STRUCTURE. VIBRATION ISOLATORS SHALL BE SELECTED IN ACCORDANCE WITH THE MASON INDUSTRIES SELECTION DATA CONSIDERING A MINIMUM OF 5% TRANSMISSION OF VIBRATION.
39. FOR ALL THE HVAC EQUIPMENT, A CONDENSATE DRAIN SHOULD BE PROVIDED WITHIN TWO METERS OF THE UNIT, BY OTHERS, UNLESS STATED OTHERWISE.

LEGEND

T	- THERMOSTAT
°C	- DEGREE CENTIGRADE
l/s	- LITRES PER SECOND
DAC	- DOOR AIR CURTAIN
db	- DRY BULB
EAD	- EXHAUST AIR DUCT
EIA	- EXHAUST AIR
EDH	- ELECTRIC DUCT HEATER
EG	- EXHAUST AIR GRILLE
ESP.	- EXTERNAL STATIC PRESSURE
EF	- EXHAUST FAN
FAD	- FRESH AIR DUCT
FCU	- FAN COIL UNIT
Pa	- PASCAL
kW	- KILO WATT
QTY.	- QUANTITY
RIA	- RETURN AIR
RAG	- RETURN AIR GRILLE
RLG	- RETURN LINEAR GRILLE
RWG	- RETURN WALL GRILLE
S/A	- SUPPLY AIR
SAF	- SUPPLY FAN
SCG	- SUPPLY CEILING GRILLE
SCD	- SUPPLY CEILING DIFFUSER
S.S	- STAINLESS STEEL
SWG	- SUPPLY WALL GRILLE
T/A	- TRANSFER AIR
TAG	- TRANSFER AIR GRILLE
TAD	- TRANSFER AIR DUCT
TEMP	- TEMPERATURE
UC OR ●	- UNDER CUT (25mm) MIN.
wb	- WET BULB
W.O	- WALL OPENING
F.D	- FIRE DAMPER (? HOUR RATING)
F.S.D	- FIRE/SMOKE DAMPER (? HOUR RATING)

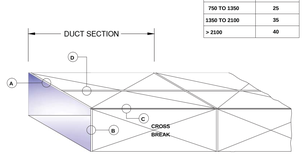
4-WAY BLOW DIFFUSER — 3-WAY BLOW DIFFUSER

- WALL GRILLE DOUBLE DEFLECTION
- INSULATED FLEXIBLE DUCT
- COMMISSIONING POINT
- LI - LOCAL ISOLATOR

UPSTAND SEAM DIMENSION TABLE	
LONGER DUCT DIMENSION (mm)	"H" (mm)
< 750	25
750 TO 1350	25
1350 TO 2100	35
> 2100	40

LOW PRESSURE DUCTWORK JOINTS AND SEAMS

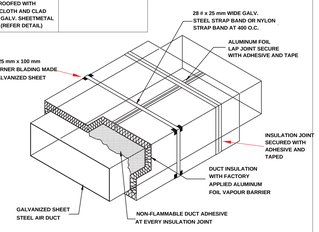
- A — PLAIN "S" SLIP — USE ON DUCT SIDES < 600mm
- B — MEZ FLANGE — USE ON DUCT SIDES > 600mm
- A — BAR SLIP — USE ON DUCT SIDES 601mm TO 1000mm
- C — PITTSBURGH LOCK SEAM — USE ON ALL SIZE DUCTS
- A — SEALANT + FLANGED JOINT — USE ON DUCT SIDES 801mm TO 2000mm
- D — FLAT LOCK GROOVED SEAM — USE ON DUCT SIDES < 600mm
- A — GASKET + CLAMP + MEZ FLANGE — USE ON DUCT SIDES > 600
- D — DOUBLE SEAM — USE ON DUCT SIDES > 600mm
- B — DRIVE SLIP — USE ON DUCT SIDES < 600mm



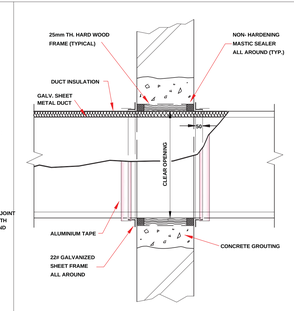
1 EXAMPLES OF LOW PRESSURE DUCT JOINTS & SEAMS
N.T.S

REFER TO SANS 1238 (LATEST EDITION) FOR FURTHER DETAILS OF LOW, MEDIUM & HIGH PRESSURE DUCTS

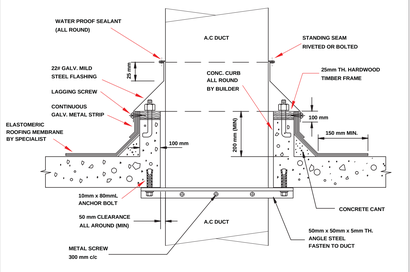
INSULATION NOTES	
EXTERNAL DUCTS	INTERNAL DUCTS
50mm THICK FIBREGLASS DENSITY: 32kg/m³ WITH ALUMINIUM FOIL-FACED WRAPPING & VAPOUR-SEAL. WATERPROOFED WITH CANVAS CLOTH AND CLAD WITH 26# GALV. SHEETMETAL (3 SIDES) (REFER DETAIL)	25mm THICK FIBREGLASS DENSITY: 24kg/m³ WITH ALUMINIUM FOIL-FACED WRAPPING AND VAPOUR-SEAL



2 RECTANGULAR DUCT INSULATION DETAIL
N.T.S

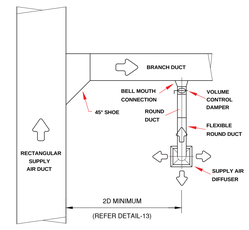


3 DUCT THRU WALL DETAILS
N.T.S

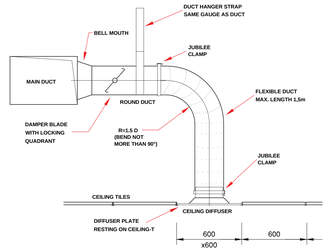


NOTE:
FLASHING AND SUPPORT MATERIAL TO BE COMPATIBLE WITH DUCT WORK MATERIAL

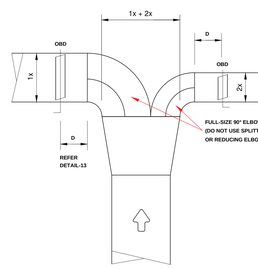
4 DUCT THRU ROOF DETAILS
N.T.S



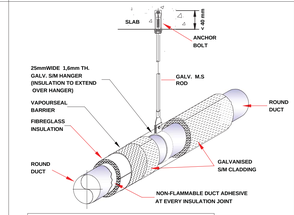
5 TYPICAL BRANCH CONNECTION DETAIL
NTS



6 FLEXIBLE DUCT INSTALLATION
N.T.S

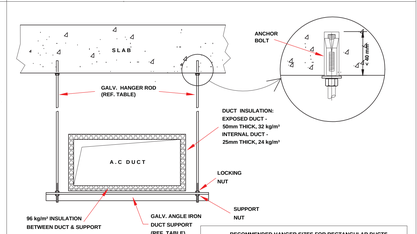


7 TYP. DUCT SPLITTING / BRANCH CONNECTION
N.T.S



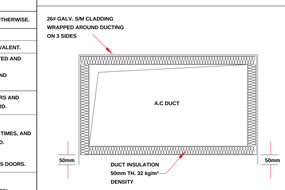
MINIMUM HANGER SIZES FOR ROUND DUCT		
DUCT Ø (mm)	HANGER INTERVAL (mm)	HANGER ROD Ø (mm)
250	3000	6
450	3000	6
600	3000	6
900	3000	10
1250	2400	10
1500	2400	10
2100	2400	10

8 EXPOSED ROUND DUCT SUPPORT AND INSULATION
N.T.S

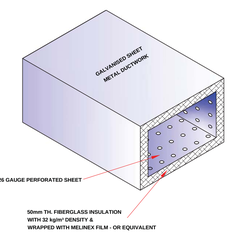


RECOMMENDED HANGER SIZES FOR RECTANGULAR DUCTS				
LONGER DUCT DIMENSION (mm)	ANGLE IRON (SUPPORT)	HANGER ROD (mm)	GALV. STRAP HANGER (mm)	MAX. SPACING (mm)
UP TO 760	25x25x3	Ø6mm	25 x 1,6	3000
761 TO 1000	30x35x3	Ø6mm	25 x 1,6	3000
1001 TO 1200	50x50x3	Ø10mm	25 x 1,6	2400
2101 TO 2400	50x50x6	Ø10mm	25 x 1,6	2400
2401 AND OVER	50x50x6	Ø12mm	25 x 1,6	2400

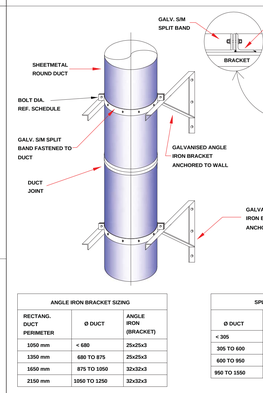
9 RECTANGULAR HORIZONTAL DUCT SUPPORT
N. T. S



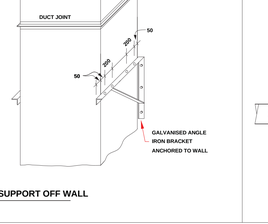
10 EXPOSED DUCT CLADDING DETAIL
N.T.S



11 ACOUSTIC INSULATION OF DUCTWORK
N.T.S

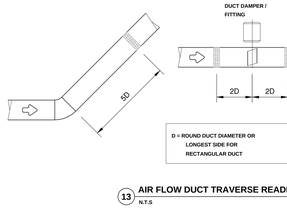


ANGLE IRON BRACKET SIZING		
RECTANG. DUCT PERIMETER	Ø DUCT	ANGLE IRON (BRACKET)
1050 mm	< 680	25x25x3
1350 mm	680 TO 875	25x25x3
1650 mm	875 TO 1050	32x32x3
2150 mm	1050 TO 1250	32x32x3



SPLIT BAND SIZING		
Ø DUCT	GALV. S/M BAND WIDTH	Ø BOLT
< 305	25mm (16#)	6mm
305 TO 600	25mm (16#)	6mm
600 TO 950	51mm (16#)	10mm
950 TO 1550	51mm (16#)	10mm

12 DETAIL OF DUCT RISER SUPPORT OFF WALL
N.T.S



13 AIR FLOW DUCT TRAVERSE READING POINTS
N.T.S

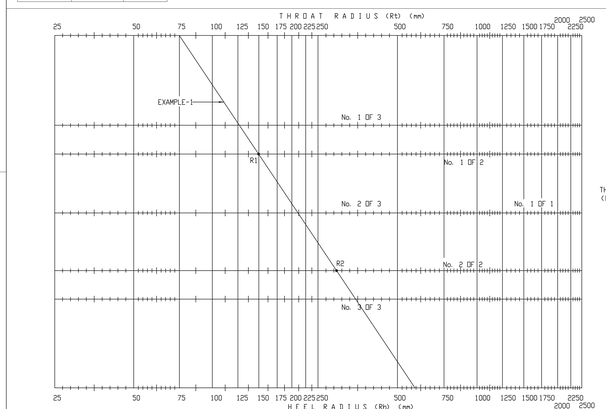
DUCTWORK MATERIAL SCHEDULE	
AIR SYSTEM	MATERIAL
LOW PRESSURE SUPPLY	MILD STEEL GALVANIZED NOT LESS THAN 24#
RETURN	MILD STEEL GALVANIZED
GENERAL EXHAUST DUCT SYSTEM	MILD STEEL GALVANIZED
KITCHEN EXHAUST SYSTEM	CARBON STEEL (16# MIN.)
LAB EXHAUST SYSTEM	STAINLESS STEEL 316 (22# MIN.)
VAPOUR LADEN EXHAUST	ALUMINUM (MIN 1.27mm) OR STAINLESS STEEL 316 (22# MIN.)
OUTSIDE AIR INTAKE/SUPPLY	MILD STEEL GALVANIZED

DUCTWORK PRESSURE CLASS SCHEDULE	
AIR SYSTEM	PRESSURE CLASS
AIR SUPPLY SYSTEM (FCU)	250 Pa
AIR SUPPLY SYSTEM (AHU)	500 TO 750 Pa
RETURN	250 Pa
RETURN AND RELIEF	250 Pa
KITCHEN EXHAUST	750 Pa
LAB EXHAUST	250 Pa
GENERAL EXHAUST	500 Pa
OUTSIDE AIR INTAKE/SUPPLY	500 Pa

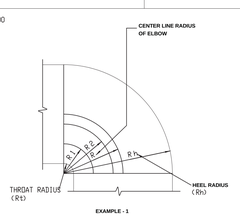
STANDARD CONSTRUCTION FOR RECTANGULAR LOW PRESSURE DUCTS (500 Pa)		
LONGER SIDE OF DUCT (mm)	SHEET METAL GAUGE (#)	MAXIMUM DISTANCE BETWEEN JOINTS (m)
≤ 300	24	2,4
300 TO 450	22	2,4
450 TO 750	22	2,4 OR 1,2
750 TO 1050	22	1,2
1050 TO 1350	22	1,2
1350 TO 1550	20	1,2
1550 TO 2150	20	1,2
2150 TO 2450	18	1,2

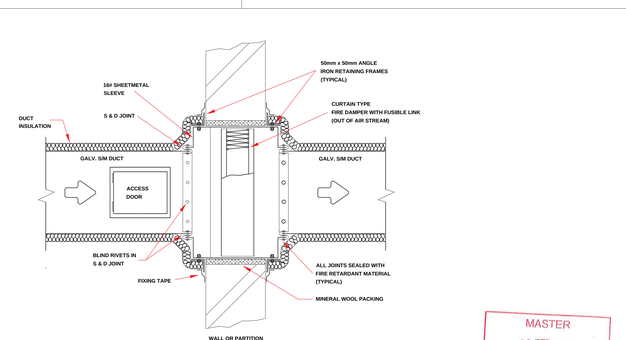
14 A.C DUCT THICKNESSES AND PRESSURES

NOTES
THE CONTRACTOR SHALL APPLY S.M.A.C.N.A TABLE 3-5 FOR 500 Pa STATIC PRESSURE, OR LESS.
THE CONTRACTOR SHALL PROVIDE REINFORCEMENT IN ACCORDANCE WITH SELECTED GAUGES SHOWN.



15 VANE LOCATION FOR RECTANGULAR ELBOWS
N.T.S





ALL FIRE DAMPERS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA REGULATIONS

16 FIRE DAMPER DETAIL
N.T.S

MASTER
10 FEB 2017
AECOM TRANSNET

REFERENCE DRAWINGS	
DRAWING NO.	REFERENCE

NOTES
1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

AECOM
CAPE TOWN OFFICE
WATERSIDE PLACE, SOUTH GATE
TYGER WATERFRONT
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TEL: +27 (0)21 950 7500
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REG. No. 1966/006628/07

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	KC	JJ	AD	27-01-17

REVISIONS

CONTRACTOR/CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	K.C.		27 01 17
				CHECKED	J.J.		27 01 17
				DESIGNED	J.J.		27 01 17
				CHECKED	A.D.		27 01 17

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

PR.ENG./PR.TECH/PR.ARCH		
NAME	ANDREW DALLY	DATE
SIGNATURE		27 01 17
REG. NUMBER	9170004	
SCALE:	N.T.S.	A0

Transnet Capital Projects
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) - REG. NO. 1960/000906/06
TABLE BAY BUILDING, TYGERBERG PARK,
163 UYS KRIGE DRIVE, PLATTEKLOOF,
8001
TEL: 021 940 1999
FAX: 086 677 2455

PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
MAIN INTAKE SUBSTATION
STANDARD DUCTING DETAILS

PROJECT NUMBER					OD	FBS			DIS	TYPE	DRAWING NO.			SHEET		REV	ID
1	9	2	4	7	0	1	2	5	1	0	M	S	T	0	0	0	8	0	1	0	0	AE

STANDARD PIPING NOTES

CHILLED WATER PIPE INSTALLATIONS

1. GENERAL

Refer to Project Technical Specification for specific details of piping installation.

Pipes, strainers and other fittings up to 50mm may be screwed or flanged.

Valves, strainers and other fittings larger than 50mm must be flanged.

Thread must be in accordance with BS 21 and flanges to ASA standard or BS 4504 unless otherwise specified.

Galvanised piping must be screwed when smaller than 50 mm and flanged above 50 mm.

Clean all piping before connecting.

Welding to galvanised piping or fittings is not permitted.

Where welding for whatever purpose is unavoidable the complete section must be hot dip galvanised after manufacture.

Cold galvanising is not acceptable.

Use full radius bends and sweep fittings wherever possible. Use elbows only under exceptional conditions

Where it is necessary to reduce pipes in size, use only reducing sockets and not bushes.

Provide all pipelines with 15mm drain cocks at all low points in the system so that the pipe work can be drained of liquid without dismantling.

Install horizontal pipes with a slope of at least 1 in 500 to allow venting of air to the expansion tank wherever possible. Fit all pipes in such a manner as to prevent the formation of air locks and air pockets. Provide high points with automatic air vent valves or air bottles. Air vents or bottles must be designed for at least 1,5 times the working pressure of the system.

Arrange piping in plant rooms so that normal inspection and servicing of equipment is not obstructed.

Size pipes which are not dimensioned on drawings using the following criteria:

- The velocity must not exceed 2,5 m/s.
- The friction rate must not exceed 60 kPA per 100m length.

Pipe expansion joints, where required, shall be of the bellows type manufactured from stainless steel or may be of the Viking Johnson pipe coupling or equal where moderate expansion movements are to be accommodated.

Chilled water piping shall be black medium tubing, conforming to SANS 62-1.
Screwed joints may be used for piping of diameter up to and including 50mm diameter whereas all piping in excess of this diameter shall be jointed by the welded process, using flanges where stated below.

Pipes of diameter in excess of 150mm shall be constructed of seamless black steel in accordance with SABS 62-1971 with welded joints only.

All black pipe fittings shall conform with SABS 509-1955.

Welding of pipework shall be carried out only by qualified welders and the Employer reserves the right to have cut for examination.

Connections to air handling units, pumps, chillers and other major equipment shall be flanged in the case of piping of diameter 65mm and over and shall be joined using cone face unions in the case of piping of diameter less than 65mm, to enable sections of the air conditioning system to be removed and replaced.

In all piping installations due allowance shall be made for the thermal expansion and contraction of the piping material.

The chilled water system and the hot water system shall each be supplied with expansion tanks of the asbestos or copper type each with a minimum water volume of 150 litres, complete with ball valve, quick-fill and drain connections.

Automatic air release valves shall be fitted at the top of the riser pipe stacks, and in any other positions in the hot water, chilled water and condenser water systems where necessary to prevent airlocks and to facilitate commissioning of the pumping systems.

Condenser water pipes shall be of medium or heavy black steel piping to BS 1387 or SANS 719 specifications but shall be hot-dip galvanised after manufacture with a minimum coating of 300 g/m2.
Fittings shall be of heavy galvanised malleable steel or malleable iron with galvanising as above, and shall be manufactured to BS 1740 or SABS 509 specifications. Flanges shall be of cast iron or steel to BS 4504 or ASA Standards and shall be galvanised.

Drain pipes must fall with a gradient of 1:50.

Provide all drain pipes with cleaning eyes at each change in pipe direction. .

Domestic grade copper piping could be used for drain piping with elbows and fittings of the compression or solder type.

2. HANGERS AND SUPPORTS

Spring hanger mountings for vibration damping shall be used in all plant rooms.

Pipe hangers shall be adjustable in height to set the pipe gradient. .

The maximum horizontal support spacing and hanger rod diameters shall be as follows for steel chilled water, condenser water, hot water

Nominal Pipe size (mm)	Hanger Rod ø (mm)	Span (m)
12-32	6	2.5
40-65	10	3.0
80-100	12	3.5
125-150	16	4.0
200-300	22	5.0
350-500	25	6.0

The maximum horizontal support spacing for condensate (from AC units) pipes shall be as follows:

Nominal Pipe Size (mm)	Span (m)
12-20	1.0
25-40	2.0
50 and over	2.5

Hangers shall be provided at a maximum spacing of 1 metre from each elbow or pipe fitting.

3. VALVES

Valve materials shall be selected for the particular application.
For detailed valve specification refer to Project Technical Specification.
Saunders type valves or approved equivalent will be accepted.

Gate valves shall only be used as isolating or shut off valves.

Globe valves shall be used for throttling or balancing purposes.

Butterfly valves shall be used for isolating and shut off purposes.

Diaphragm valves shall only be used as shut-off purpose

Check valves shall be of the non-slam type for horizontal or vertical installation.

Plug cocks shall be used for balancing purposes.

Calibrated balancing valves shall be of the plug cock or globe type with bronze or cast iron valve bodies, bronze disc, internal seals, screwed ends, up to 50 mm and flanged ends for 65 mm ø and over. Valves shall be TOUR AGENTUR or approved equivalent.

4. STRAINERS

Strainers shall be of the angle or Y-type. Strainers up to 50 mm shall have screwed ends and strainers of 65 mm ø and above, shall have flanged ends.

Bronze or stainless steel screens will be acceptable.

Screens shall be perforated as follows:

Strainer Size (mm)	Perforation Size (mm)
10-50	1.0
65-150	1.5
200 and over	2.0

Strainers shall be provided with a 50mm blowdown pipe and cock on the cap piped to the nearest drainpoint. Flexible piping shall be used.

Strainers shall be installed on the inlet side of all hot water, chilled water and condenser water pumps.

5. GAUGES

Pressure gauges for water shall be of the Bourdon type and glycerine filled.

Pressure gauge dials shall have a diameter of at least 100 mm.

A gauge cock and siphon tube shall be provided with each gauge.

6. CONNECTIONS TO VIBRATING EQUIPMENT

Flexible connections shall be Mason Industries SAFEFLEX SFDEJ [double sphere type] or approved equivalent, which shall be provided to the suction and discharge pipes for chilled, condenser and hot water pumps.

7. TESTING OF PIPE INSTALLATIONS

All pipe fittings shall be tested hydrostatically up to a pressure of 1000 kPa or 1.5 times the maximum system pressure, whichever is the higher value.

Tests shall be carried out before the application of insulation.
Water systems shall be filled with water and air vented at least 24 hours before the test.
The test pressure shall be maintained for a period of at least 2 hours after the pressure testing pump has been disconnected.

8. FLUSHING/DRAINING

Upon the completion of all pressure tests throughout the building complex, and prior to the commencement of commissioning of pumping systems, the entire system shall be drained and flushed to ensure the removal of waste jointing material, accumulated dirt, and sundry construction materials.

Refer to Water Treatment section for method of cleaning and flushing a piping reticulation.

9. WATER TREATMENT

Refer to Project Technical Specification for specific details of "Water Treatment".

10. CHILLED WATER PIPEWORK INSULATION

All chilled water pipework, including pipe fittings and connections, shall be insulated with Polyisocyanurate (PIC) foam, with the necessary vapour barrier.
The insulation shall be applied as noted on the Detail Drawing.

Rigid preformed piping sections shall be used where applicable. Where not possible, Blocks/Batts shall be shaped to suit the pipe fitting, and securely wired/banded in position. All joints and voids shall be filled with mineral wool. The thickness of the insulation shall be maintained over the pipe fitting.
All piping shall be supported from the outside of the insulation as per Details shown. The compressive strength of the insulation shall be determined to ensure no flattening of the insulation (i.e the insulation must maintain it's thickness). Should the weight of the pipe, plus contents, cause the insulation to flatten, then either provide "saddles", or increase the density of the insulation over the bracket width.

REFRIGERATION PIPEWORK AND INSULATION

Refrigerant pipe work shall be installed on site in accordance with Project Technical Specification, and generally as shown on the Equipment layout drawings. All indoor and outdoor Refrigerant pipework shall be insulated and protected by sturdy covers against accidental damage, as needed.

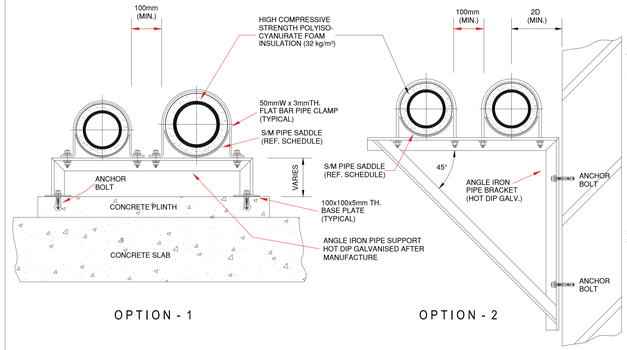
(i) Pipe Runs
(a) Type-L copper to be used.
(b) Horizontal pipes carrying vapour are to be sloped in the direction of the vapour flow.
(c) Piping to be sized to ensure the correct Refrigerant velocities and pressure drops.
(d) Liquid lines running over exposed roofs to be insulated.
(e) All internal Refrigerant pipework shall be insulated with Armaflex, or approved equal.
(f) All external Refrigerant pipework shall be insulated with 25mm thick rigid, pre-formed fibreglass sections of 48 kg/m³ density.
(g) All external Refrigerant pipework shall be vapour-sealed and cladded with Aluminium sections, or approved equal.
(h) Refer to "Typical Refrigerant Piping Diagram" detail below.
(i) All Refrigerant pipe runs / lengths to be in accordance with Supplier Requirements.
(j) All Refrigerant pipes to run in cable trays. When external to the Building, a protective cover must be fitted.

(ii) Oil Traps
(a) To be fitted at the bottom of all risers.
(b) To be fitted every 7 metres up a riser.
(c) No traps near the suction inlet of a compressor.

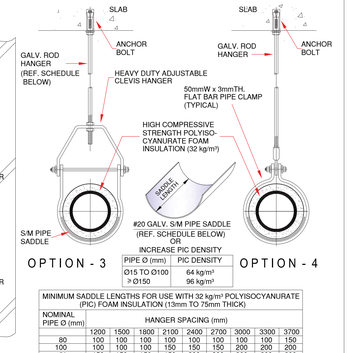
(iii) Before starting a system ensure that the Pipework is clean, and free of Contaminants.
(a) Contaminants: Air, Moisture, Copper Oxide, Metal chips and dirt.
(b) Contaminants will cause Compressor failure.
(c) Purge system with dry Nitrogen.
(d) Draw a vacuum.

(iv) Oil return to Compressor
(a) Oil travels with the Refrigerant around the system.
(b) Excessive lengths of pipework is detrimental to oil return to the Compressor.
(c) After start-up of the system, check Compressor oil level, and top up if necessary.
(d) Should the pipe lengths be run beyond the Manufacturer's recommendations, then topping up of Compressor oil is necessary.

(v) Suction line Accumulator
(a) Required to prevent Liquid flooding back to the Compressor, after the system is shut down.
(b) Systems which have excessive lengths of pipe, and fitted with "Capillary tube metering devices" must be fitted with an Accumulator.
(c) Suction Accumulator to either be part of the Condensing unit, or fitted within the Suction line.
(d) Suction Accumulator must be correctly sized.

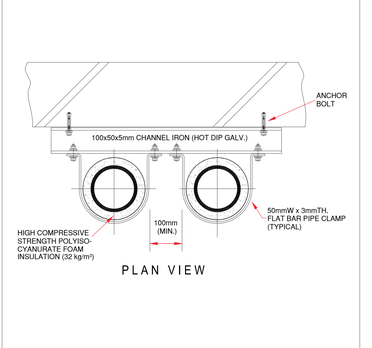


1 HORIZONTAL CHILLED / HOT WATER PIPE SUPPORTS
N.T.S



PIPE Ø (mm)	PIC DENSITY
Ø15 TO Ø100	64 kg/m³
> Ø150	96 kg/m³

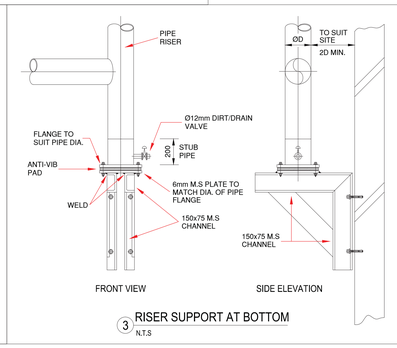
MINIMUM SADDLE LENGTHS FOR USE WITH 32 kg/m³ POLYISOCYANURATE (PIC) FOAM INSULATION (13mm TO 75mm THICK)									
NOMINAL PIPE Ø (mm)	HANGER SPACING (mm)								
	1200	1500	1800	2100	2400	2700	3000	3300	3700
80	100	100	100	100	100	100	100	100	150
100	100	100	100	150	150	150	200	200	200
150	150	150	150	150	200	200	200	200	200
200	200	200	200	200	200	200	200	200	300
250	200	200	200	300	300	300	300	300	300
300	200	200	300	300	300	300	300	300	300
400	300	300	450	450	450	450	450	450	450



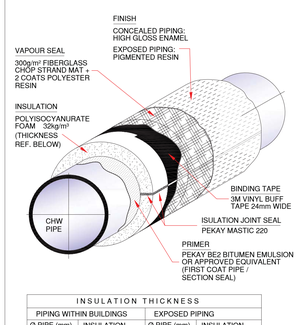
2 VERTICAL CHILLED / HOT WATER PIPE SUPPORTS
N.T.S

LEGEND

- PUMP
- BUTTERFLY VALVE
- ISOLATING VALVE
- BALL VALVE
- BALL VALVE AND S-TUBE
- BALANCING VALVE
- THERMOSTATIC VALVE
- NON-RETURN (CHECK) VALVE
- SOLENOID VALVE
- MOTORISED CONTROL VALVE
- STRAINER WITH BALL VALVE
- UNION
- FLEXIBLE CONNECTION
- EXPANSION TANK
- FLOW SWITCH
- FLOW METER
- AUTOMATIC AIR VENT
- BINDER TEST ARRANGEMENT
- SUMMIT POINT
- PRESSURE GAUGE
- TEMPERATURE GAUGE

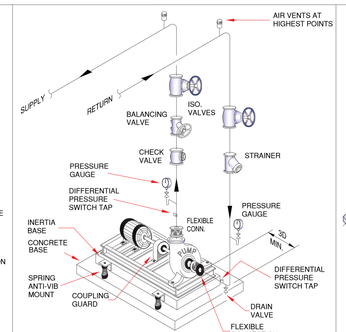


3 RISER SUPPORT AT BOTTOM
N.T.S

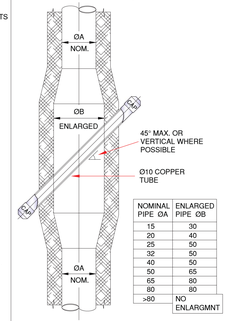


INSULATION THICKNESS			
PIPING WITHIN BUILDINGS		EXPOSED PIPING	
Ø PIPE (mm)	INSULATION THICKNESS (mm)	Ø PIPE (mm)	INSULATION THICKNESS (mm)
15 TO 80	25	15 TO 65	25
> Ø100	50	> Ø80	50

4 CH. WATER PIPE INSULATION DETAIL
N.T.S

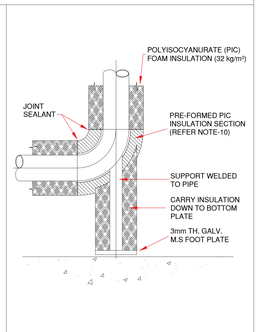


5 PUMP CONNECTION DETAILS
N.T.S

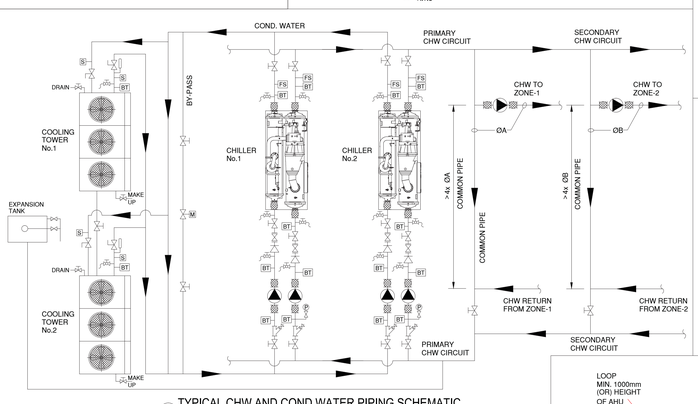


NOMINAL PIPE ØA	ENLARGED PIPE ØB
15	30
20	40
25	50
32	50
40	50
50	65
65	80
80	80
>80	NO ENLARGMNT

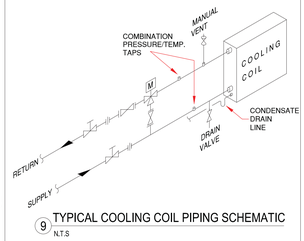
6 TEST THERMOMETER POCKET
N.T.S



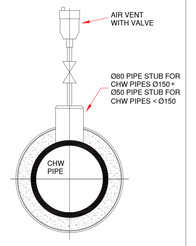
7 PEDESTAL SUPPORT AT ELBOW
N.T.S



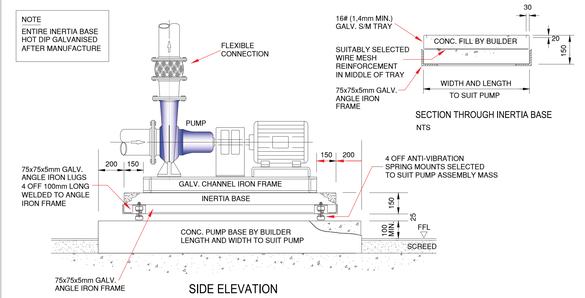
8 TYPICAL CHW AND COND.WATER PIPING SCHEMATIC
N.T.S

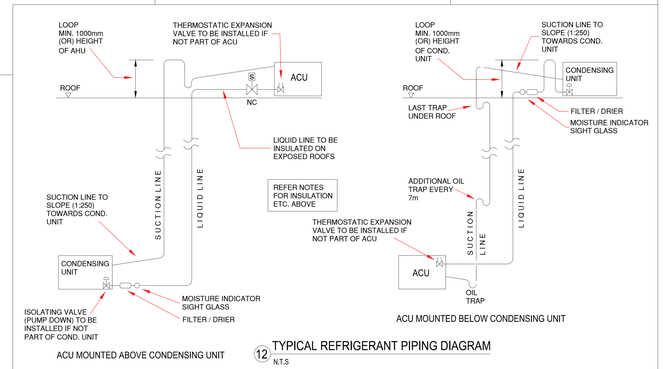


9 TYPICAL COOLING COIL PIPING SCHEMATIC
N.T.S

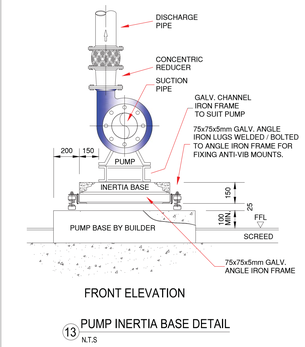


10 AIR VENT DETAIL
N.T.S

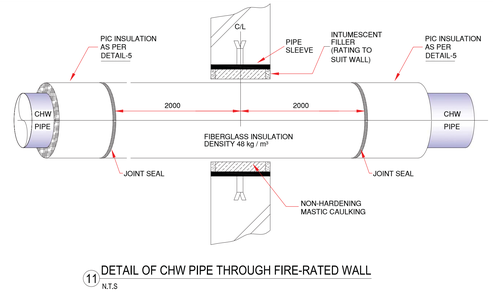




12 TYPICAL REFRIGERANT PIPING DIAGRAM
N.T.S



13 PUMP INERTIA BASE DETAIL
N.T.S



11 DETAIL OF CHW PIPE THROUGH FIRE-RATED WALL
N.T.S

MASTER
10 FEB 2017
AECOM
TRANSNET

NOTES

1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

DRAWING NO. | REFERENCE

REFERENCE DRAWINGS

AECOM

CAPE TOWN OFFICE
WATERSIDE PLACE, SOUTH GATE
TYGER WATERFRONT
CARL CRONJE DRIVE

TEL: +27 (0)21 950 7500
FAX: +27 (0)21 950 7502
REG. No. 1966/006628/07

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	KC	JJ	AD	27-01-17

REVISIONS

CONTRACTOR/CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	K.C.		27 01 17
				CHECKED	J.J.		27 01 17
				DESIGNED	J.J.		27 01 17
				CHECKED	A.D.		27 01 17

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

PR.ENG./PR.TECH./PR.ARCH		
NAME	ANDREW DALLY	DATE
SIGNATURE		27 01 17
REG. NUMBER	9170004	
SCALE:	N.T.S.	A0

Transcribe Capital Projects
TRANSNET

TRANSNET LTD. (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1990/000900/06
TABLE BAY BUILDING, TYGERBERG PARK,
163 UYS KRIGE DRIVE, PLATTEKLOOF,
8001
TEL: 021 940 1999
FAX: 086 677 2455

PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT
BULK POWER UPGRADE:
MAIN INTAKE SUBSTATION
STANDARD PIPING DETAILS

PROJECT NUMBER							OD	FBS		DIS	TYPE	DRAWING NO.			SHEET	REV	ID
1	9	2	4	7	0	1	2	5	1	0	M	S	T	0	0	0	9	0	1	0	0	AE