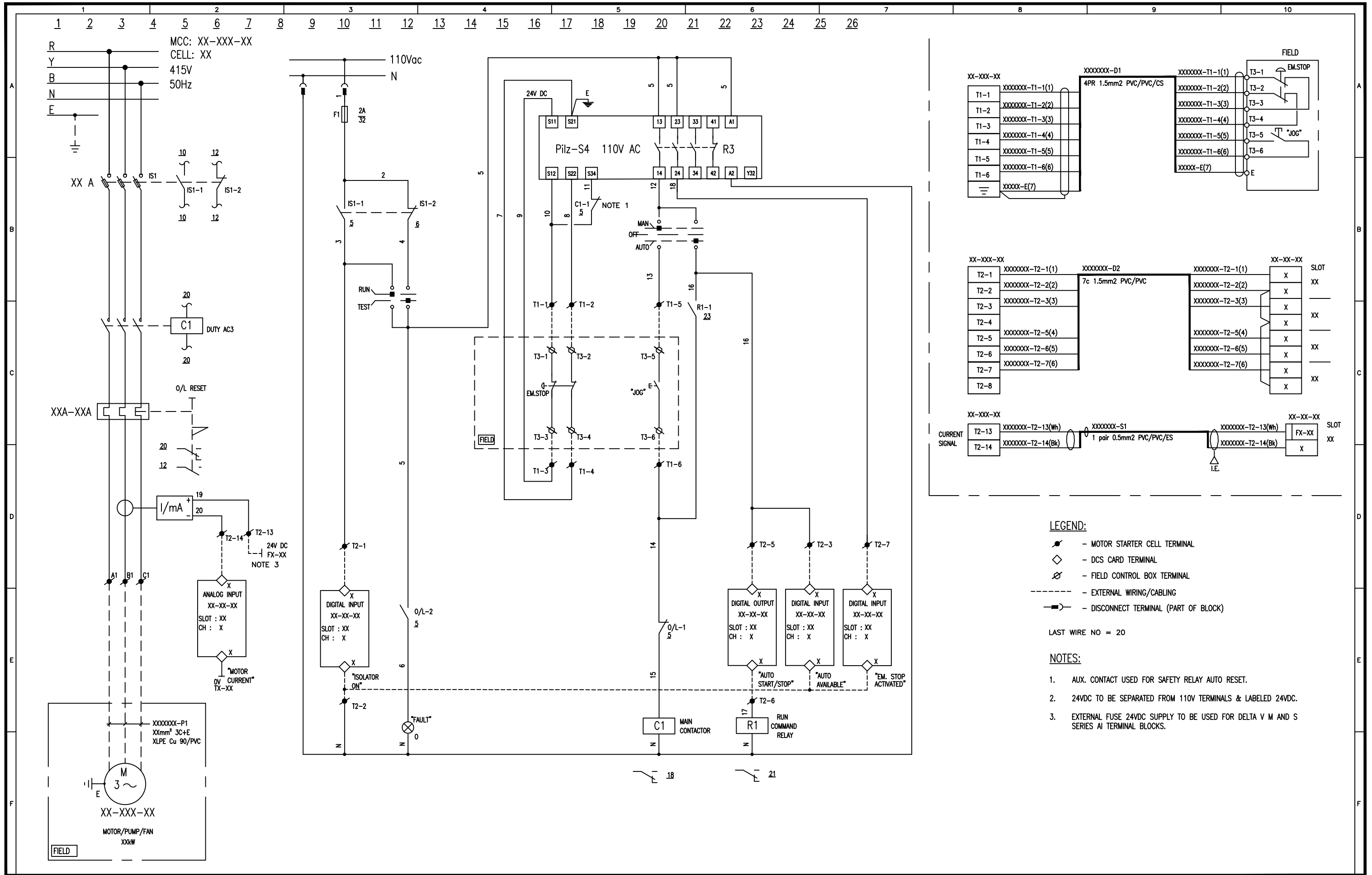


Drawing Index

This drawing set is available in AutoCAD on request and will be issued on presenting a Watercare project drawing number

Name	Doc.No	Document Description
2010699.001;E	2010699.001	MANGERE WWTP SITE SPECIFIC STANDARD MOTOR STARTER SCHEMATIC DOL < 11KV
2010699.002;E	2010699.002	MANGERE WWTP SITE SPECIFIC STANDARD; MOTOR STARTER SCHEMATIC DOL > 11KV
2010699.003;E	2010699.003	MANGERE WWTP SITE SPECIFIC STANDARD; MOTOR STARTER SCHEMATIC DOL SUBMERSIBLE PUMP <70KW
2010699.004;B	2010699.004	MANGERE WWTP SITE SPECIFIC STANDARD; MOTOR STARTER SCHEMATIC DOL SUBMERSIBLE PUMP > 70KW
2010699.005;D	2010699.005	MANGERE WWTP SITE SPECIFIC STANDARD; MOTOR STARTER SCHEMATIC VARIABLE SPEED DRIVE
2010699.006;C	2010699.006	MANGERE WWTP SITE SPECIFIC STANDARD; MOTOR STARTER SCHEMATIC VARIABLE SPEED DRIVE SUBMERSIBLE PUMP < 70KW
2010699.007;C	2010699.007	MANGERE WWTP SITE SPECIFIC STANDARD; MOTOR STARTER SCHEMATIC VARIABLE SPEED DRIVE SUBMERSIBLE PUMP > 70KW
2010699.008;A	2010699.008	MANGERE WWTP SITE SPECIFIC STANDARD MOTOR STARTER SCHEMATIC SUMP PUMP < 2.2KW
2010699.009;A	2010699.009	MANGERE WWTP SITE SPECIFIC DCS SCHEMATIC TYPICAL LAYOUT
2010699.010;A	2010699.010	MANGERE WWTP SITE SPECIFIC DCS SCHEMATIC POWER DISTRIBUTION DIAGRAM



ISSUE	DATE	AMENDMENT	BY	APPD.	DESIGNED	DATE
E	06.17	MINOR CHANGES	R.M		GJ	12.06.14
D	28.10.16	NOTE 3 ADDED	IW	RMCM	RMCM	12.06.14
C	24.07.15	NOTES ADDED	IW	RMCM	IW	12.06.14
B	19.05.14	MINOR CHANGES	IW	RMCM	GJ	12.06.14
A	5.12.13	MINOR CHANGES	IW	RMCM	JT	12.06.14

DESIGNED	GJ	12.06.14
DES. CHECKED	RMCM	12.06.14
DRAWN	IW	12.06.14
DWG. CHECKED	GJ	12.06.14
PROJECT LEADER	JT	12.06.14
INFRASTR'R APP'D		

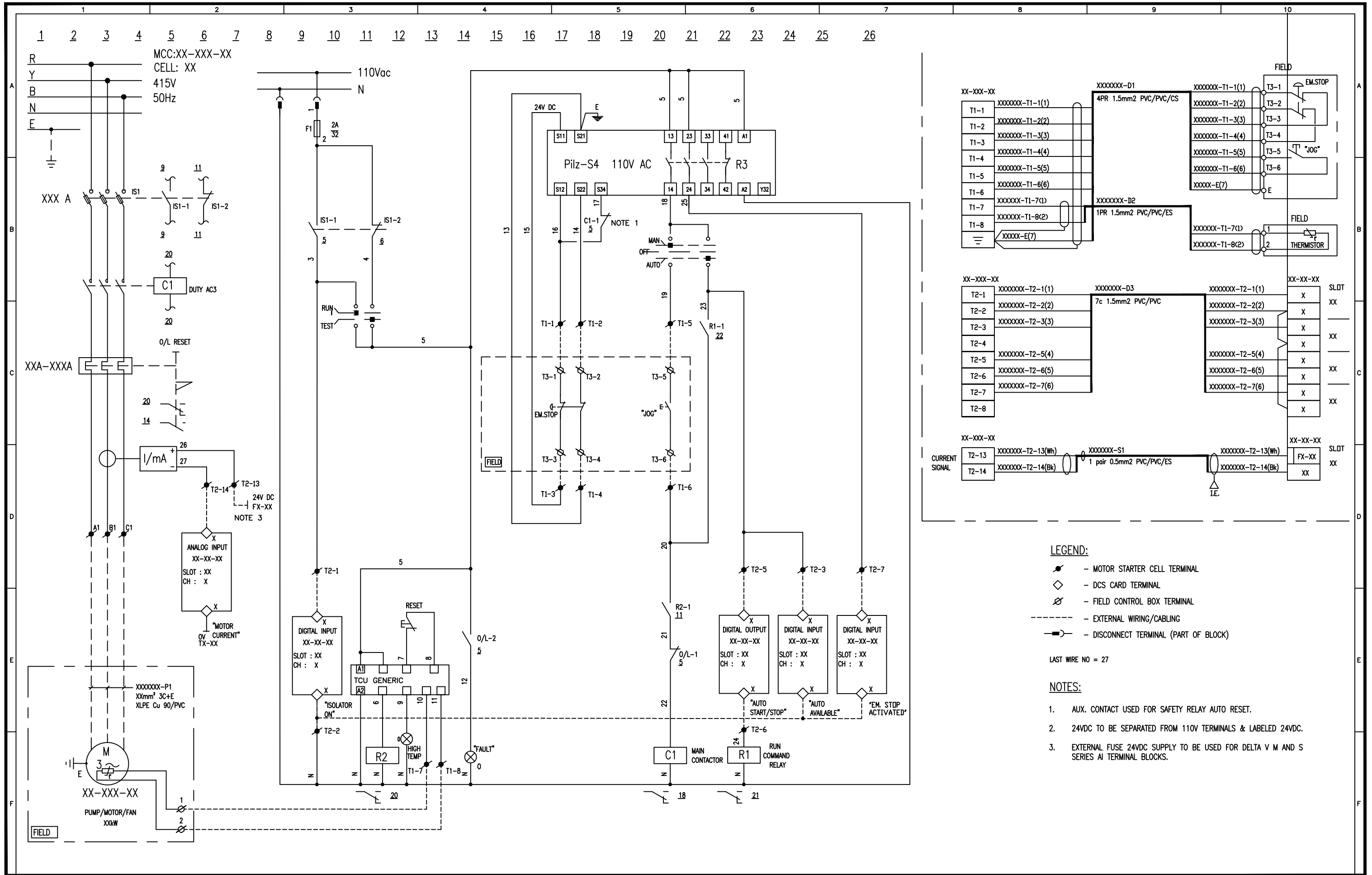
OPERATIONS

INFRASTRUCTURE



MANGERE WASTEWATER TREATMENT PLANT
STANDARD MOTOR STARTER SCHEMATICS
DOL <11kW

CAD FILE	2010699.001E	DATE	22:06:2017
ORIGINAL SCALE	A3	CONTRACT No.	
REFERENCE No.		ISSUE	
DRAWING No.	2010699	ISSUE	E
	.001		



LEGEND:

- MOTOR STARTER CELL TERMINAL
- DCS CARD TERMINAL
- FIELD CONTROL BOX TERMINAL
- EXTERNAL WIRING/CABLING
- DISCONNECT TERMINAL (PART OF BLOCK)

LAST WIRE NO = 27

NOTES:

1. AUX. CONTACT USED FOR SAFETY RELAY AUTO RESET.
2. 24VDC TO BE SEPARATED FROM 110V TERMINALS & LABELED 24VDC.
3. EXTERNAL FUSE 24VDC SUPPLY TO BE USED FOR DELTA V M AND S SERIES AI TERMINAL BLOCKS.

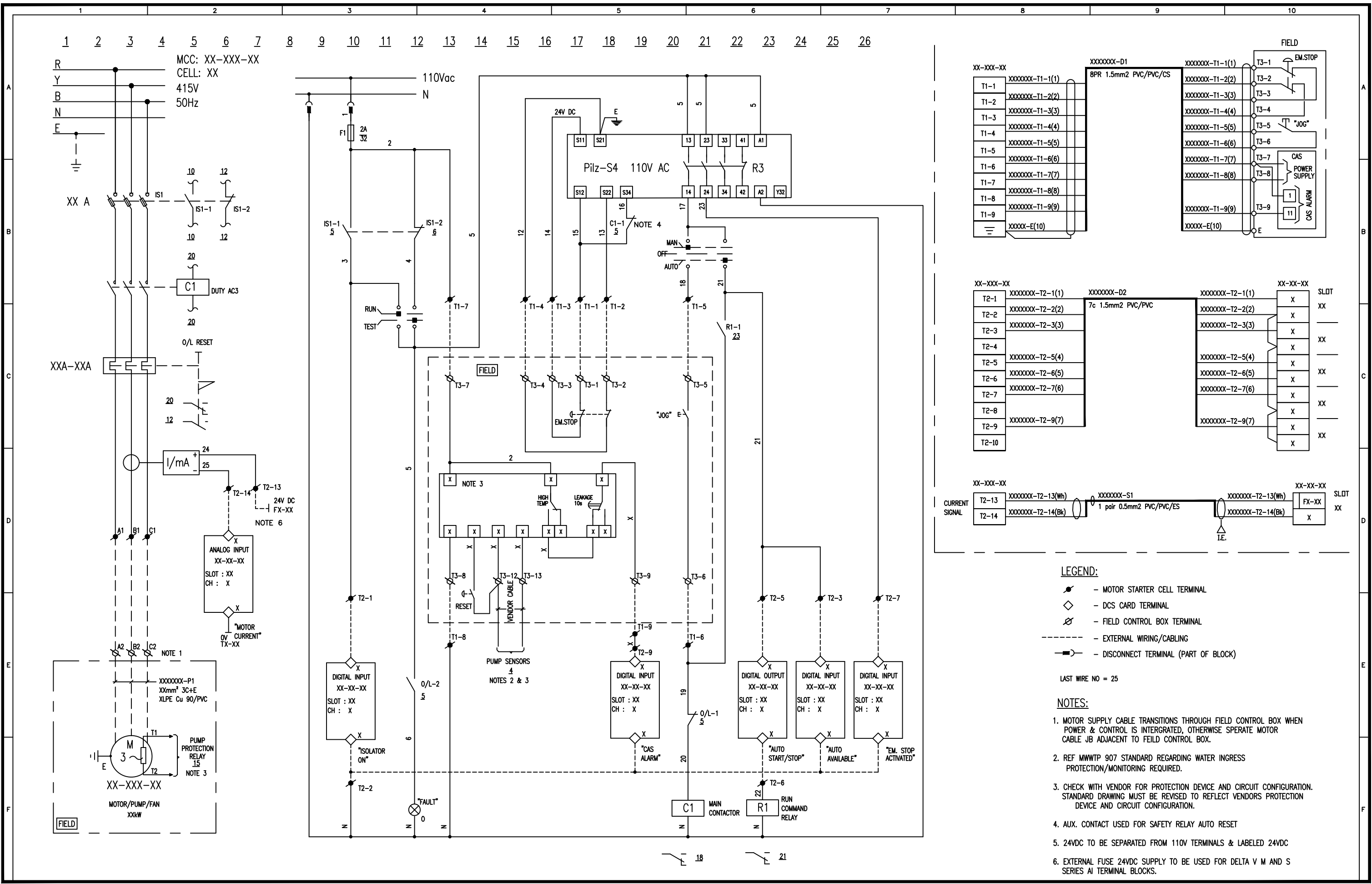
ISSUE	DATE	AMENDMENT	BY	APPD.	DESIGNED	BY	DATE
E	06.17	MINOR CHANGES	R.M		DES. CHECKED	GJ	12.06.14
D	28.10.16	NOTE 3 ADDED	IW	RMCM	DRAWN	IW	12.06.14
C	24.07.15	NOTES ADDED	IW	RMCM	DWG. CHECKED	GJ	12.06.14
B	19.5.14	MINOR CHANGES	IW	RMCM	PROJECT LEADER	JT	12.06.14
A	5.12.13	MINOR CHANGES	IW	RMCM	INFRASTR APP'D		

OPERATIONS	
INFRASTRUCTURE	

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MANGERE WASTEWATER TREATMENT PLANT
 STANDARD MOTOR STARTER SCHEMATICS
 DOL > 11kW

CAD FILE	2010699.002E	DATE	22:06:2017
ORIGINAL SCALE	A3	CONTRACT No.	
REFERENCE No.		ISSUE	
DRAWING No.	2010699	ISSUE	E



ISSUE	DATE	AMENDMENT	BY	APPD.	DESIGNED	DATE	OPERATIONS	INFRASTRUCTURE
E	06.17	MINOR CHANGES	R.M		GJ	12.06.14		
D	28.10.16	NOTE 6 ADDED	IW	RMCM	RMCM	12.06.14		
C	24.07.15	NOTES 4 & 5 ADDED	IW	RMCM	RMCM	12.06.14		
B	19.5.14	MINOR CHANGES	IW	RMCM	GJ	12.06.14		
A	5.12.13	MINOR CHANGES	IW	RMCM	JT	12.06.14		

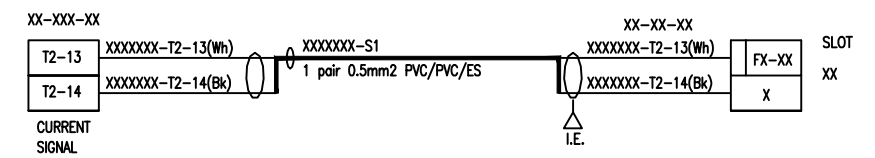
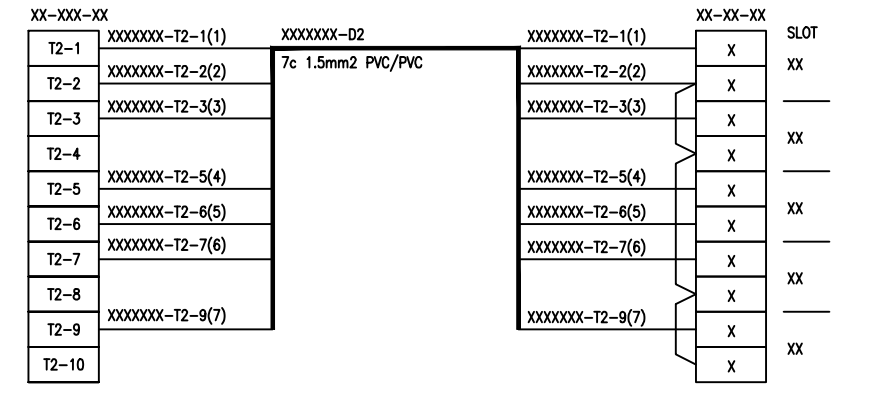
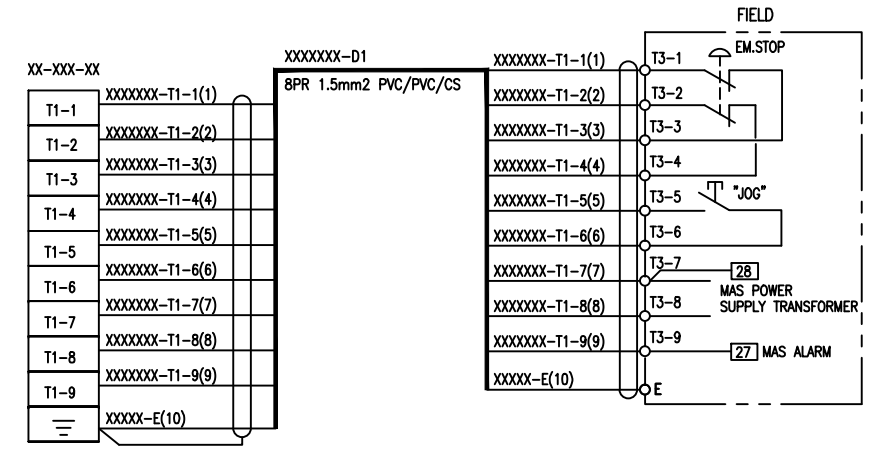
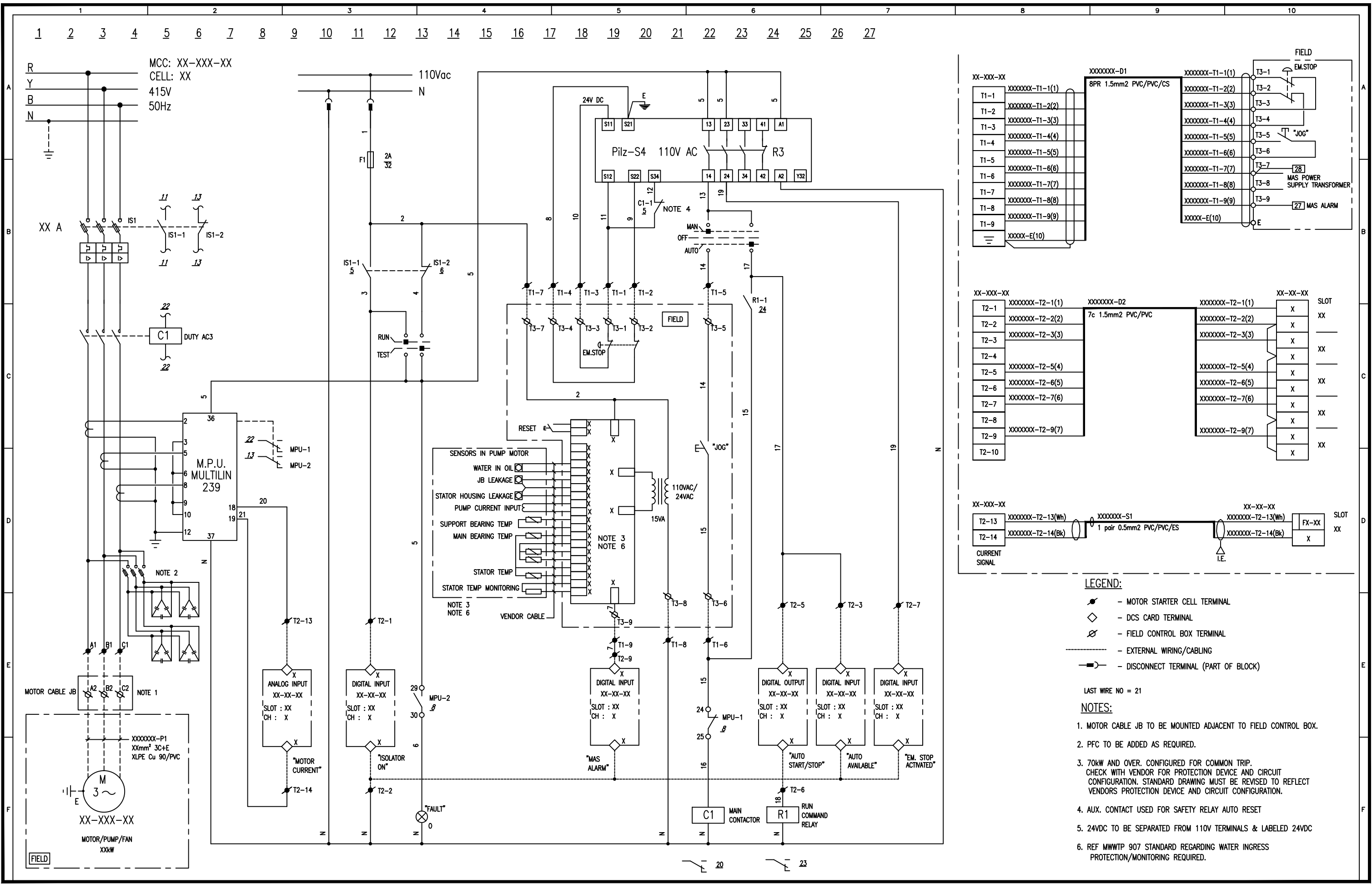
DESIGNED: GJ 12.06.14
 DES. CHECKED: RMCM 12.06.14
 DRAWN: IW 12.06.14
 DWG. CHECKED: GJ 12.06.14
 PROJECT LEADER: JT 12.06.14
 INFRASTR'R APP'D: RMCM

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MANGERE WASTEWATER TREATMENT PLANT
 STANDARD MOTOR STARTER SCHEMATICS
 DOL SUBMERSIBLE PUMP <70kW

CAD FILE	2010699.003E	DATE	22:06:2017
ORIGINAL SCALE	A3	CONTRACT No.	
REFERENCE No.		ISSUE	
DRAWING No.	2010699	ISSUE	E
	.003		



- LEGEND:**
- - MOTOR STARTER CELL TERMINAL
 - ◇ - DCS CARD TERMINAL
 - ⊗ - FIELD CONTROL BOX TERMINAL
 - - EXTERNAL WIRING/CABLING
 - ⊞ - DISCONNECT TERMINAL (PART OF BLOCK)

- LAST WIRE NO = 21
- NOTES:**
1. MOTOR CABLE JB TO BE MOUNTED ADJACENT TO FIELD CONTROL BOX.
 2. PFC TO BE ADDED AS REQUIRED.
 3. 70kW AND OVER. CONFIGURED FOR COMMON TRIP. CHECK WITH VENDOR FOR PROTECTION DEVICE AND CIRCUIT CONFIGURATION. STANDARD DRAWING MUST BE REVISED TO REFLECT VENDORS PROTECTION DEVICE AND CIRCUIT CONFIGURATION.
 4. AUX. CONTACT USED FOR SAFETY RELAY AUTO RESET
 5. 24VDC TO BE SEPARATED FROM 110V TERMINALS & LABELED 24VDC
 6. REF MWWTP 907 STANDARD REGARDING WATER INGRESS PROTECTION/MONITORING REQUIRED.

ISSUE	DATE	AMENDMENT	BY	APPD.	DESIGNED	DATE
					GJ	12.06.14
					Rmcm	12.06.14
					IW	12.06.14
B	06.17	MINOR CHANGES	R.M		GJ	12.06.14
A	24.07.15	NOTES 4 & 5 ADDED	IW	Rmcm	JT	12.06.14
-	20.05.14	FOR AS BUILT	IW	Rmcm		

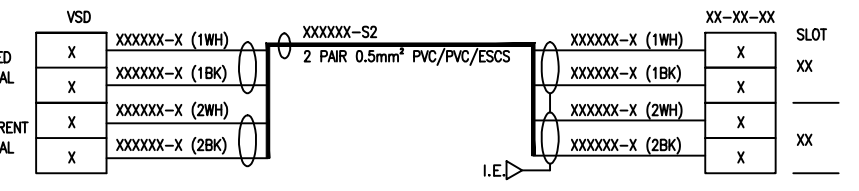
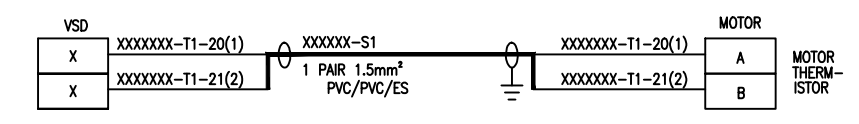
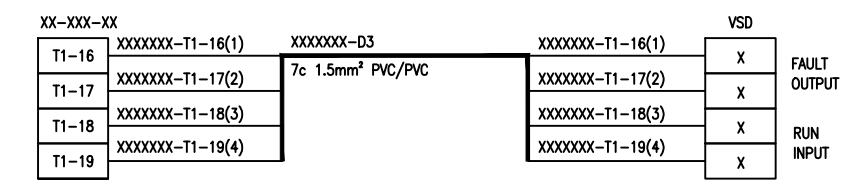
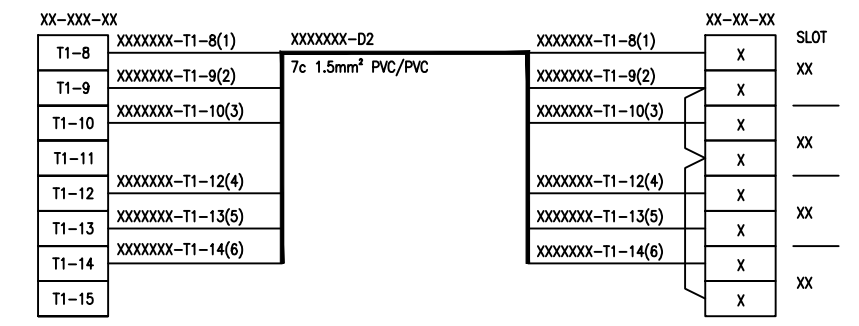
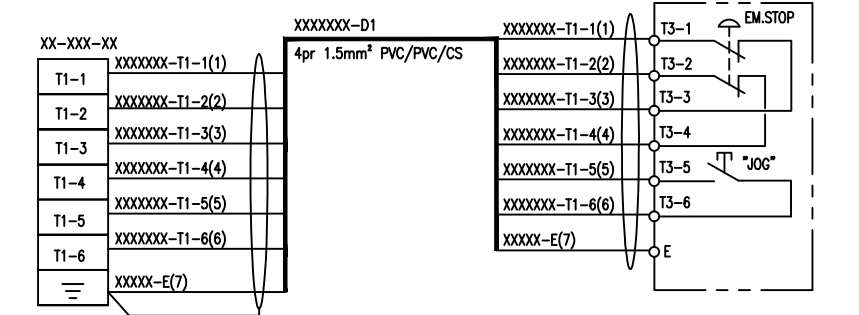
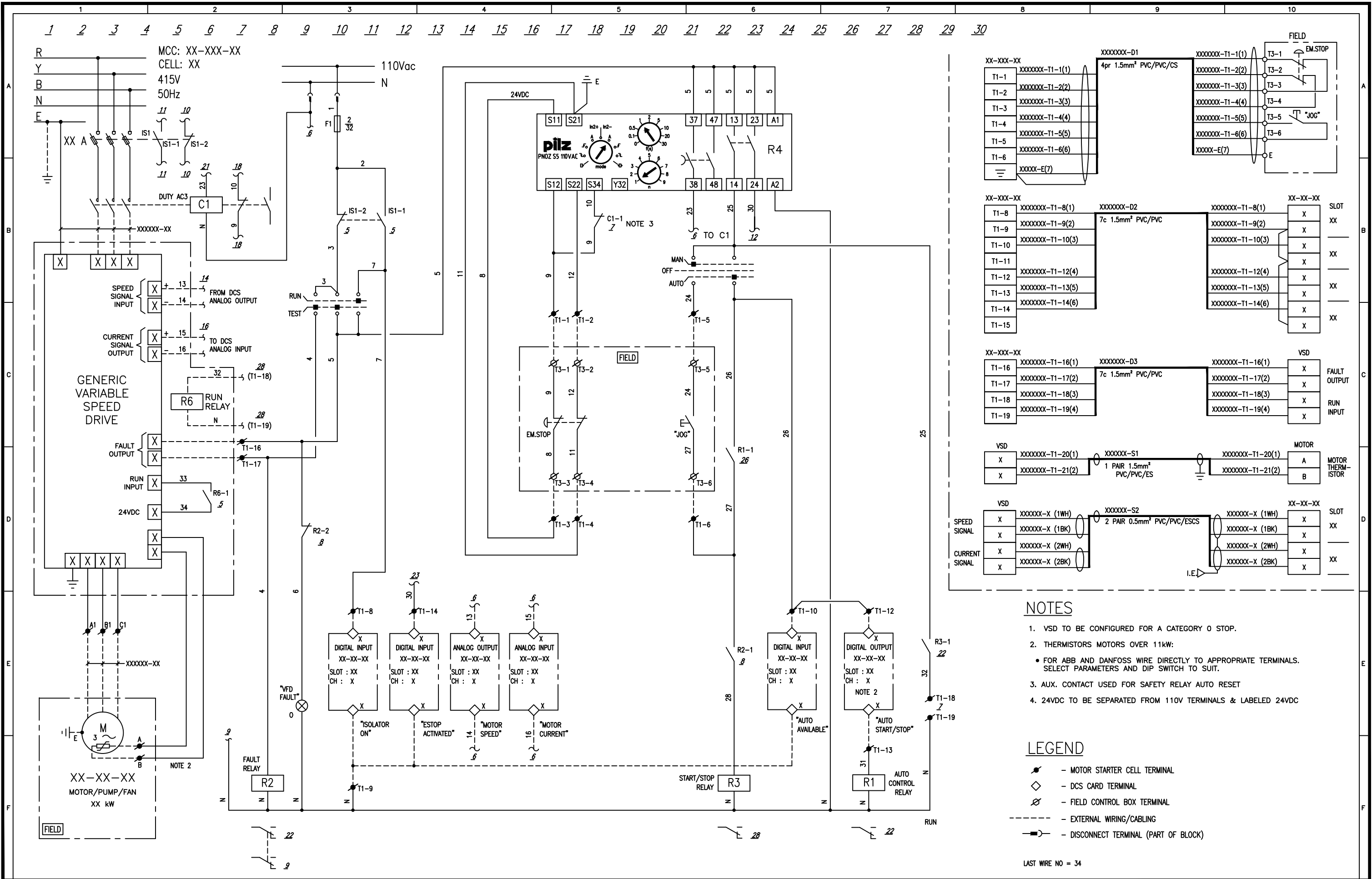
OPERATIONS	DESIGNED	DATE
	GJ	12.06.14
	Rmcm	12.06.14
	IW	12.06.14
	GJ	12.06.14
	JT	12.06.14



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MANGERE WASTEWATER TREATMENT PLANT
STANDARD MOTOR STARTER SCHEMATICS
DOL SUBMERSIBLE PUMP >70kW

CAD FILE	DATE
2010699.004B	22:06:2017
ORIGINAL SCALE	CONTRACT No.
A3	
REFERENCE No.	ISSUE
DRAWING No.	ISSUE
2010699	.004 B



NOTES

- VSD TO BE CONFIGURED FOR A CATEGORY 0 STOP.
- THERMISTOR MOTORS OVER 11kW:
 - FOR ABB AND DANFOSS WIRE DIRECTLY TO APPROPRIATE TERMINALS. SELECT PARAMETERS AND DIP SWITCH TO SUIT.
- AUX. CONTACT USED FOR SAFETY RELAY AUTO RESET
- 24VDC TO BE SEPARATED FROM 110V TERMINALS & LABELED 24VDC

LEGEND

- MOTOR STARTER CELL TERMINAL
- DCS CARD TERMINAL
- FIELD CONTROL BOX TERMINAL
- EXTERNAL WIRING/CABLING
- DISCONNECT TERMINAL (PART OF BLOCK)

LAST WIRE NO = 34

ISSUE	DATE	AMENDMENT	BY	APPD.	DESIGNED	GJ	12.06.14
D	28.04.17	UPDATED	IW	RMCM	DES. CHECKED	RMCM	12.06.14
C	7.11.16	THERMISTOR UPDATED	IW	RMCM	DRAWN	IW	12.06.14
B	12.10.16	NOTE 2 UPDATED	IW	RMCM	DRWG. CHECKED	GJ	12.06.14
A	24.07.15	NOTES 3 & 4 ADDED	IW	RMCM	PROJECT LEADER	JT	12.06.14
-	20.05.14	FOR AS BUILT	IW	RMCM	INFRASTR'R APP'D		

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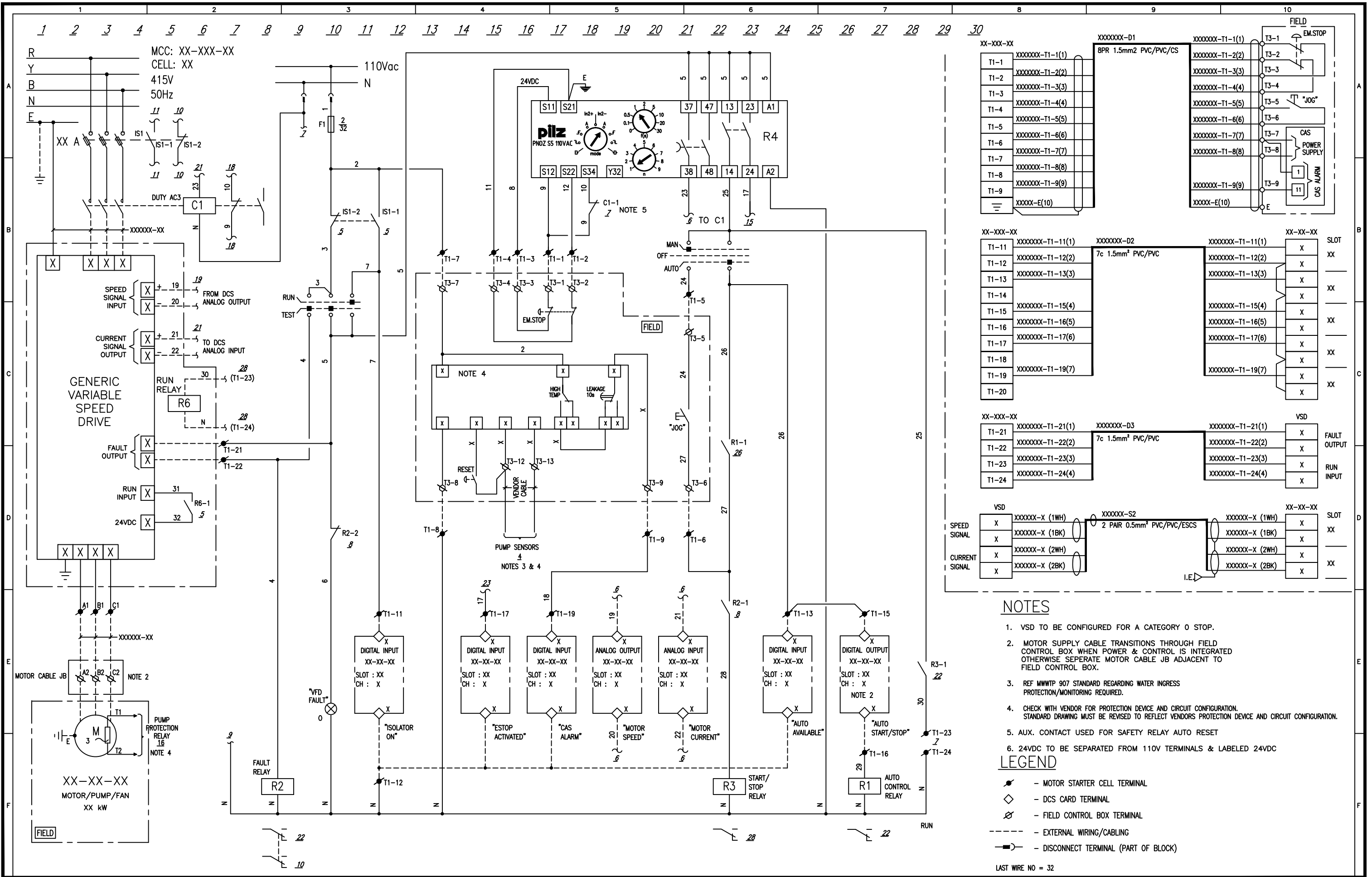
OPERATIONS

INFRASTRUCTURE

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MANGERE WASTEWATER TREATMENT PLANT
STANDARD MOTOR STARTER SCHEMATICS
VARIABLE SPEED DRIVE

CAD FILE 2010699.005D	DATE 20.05.14
ORIGINAL SCALE A3	CONTRACT No.
REFERENCE No.	ISSUE
DRAWING No. 2010699	ISSUE D



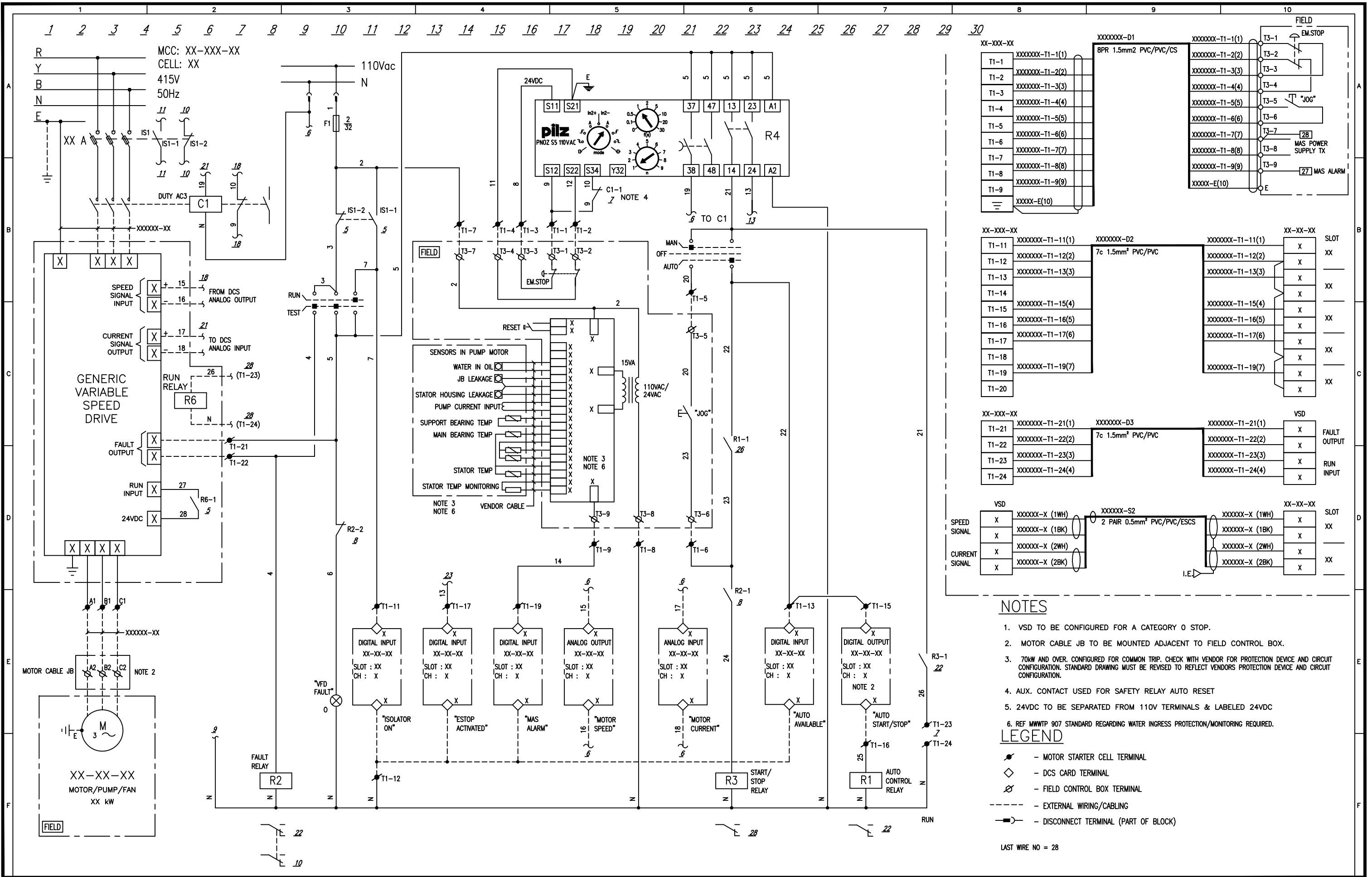
- ### NOTES
- VSD TO BE CONFIGURED FOR A CATEGORY 0 STOP.
 - MOTOR SUPPLY CABLE TRANSITIONS THROUGH FIELD CONTROL BOX WHEN POWER & CONTROL IS INTEGRATED OTHERWISE SEPERATE MOTOR CABLE JB ADJACENT TO FIELD CONTROL BOX.
 - REF MWVTP 907 STANDARD REGARDING WATER INGRESS PROTECTION/MONITORING REQUIRED.
 - CHECK WITH VENDOR FOR PROTECTION DEVICE AND CIRCUIT CONFIGURATION. STANDARD DRAWING MUST BE REVISED TO REFLECT VENDORS PROTECTION DEVICE AND CIRCUIT CONFIGURATION.
 - AUX. CONTACT USED FOR SAFETY RELAY AUTO RESET
 - 24VDC TO BE SEPARATED FROM 110V TERMINALS & LABELED 24VDC
- ### LEGEND
- MOTOR STARTER CELL TERMINAL
 - DCS CARD TERMINAL
 - FIELD CONTROL BOX TERMINAL
 - - - - - EXTERNAL WIRING/CABLING
 - DISCONNECT TERMINAL (PART OF BLOCK)
- LAST WIRE NO = 32

ISSUE	DATE	AMENDMENT	BY	APPD.	DESIGNED	DATE	OPERATIONS	INFRASTRUCTURE
C	06.17	MINOR CHANGES	R.M		GJ	12.06.14		
B	28.10.16	NOTE 4 UPDATED	IW	RMCM	RMCM	12.06.14		
A	24.07.15	NOTES 5 & 6 ADDED	IW	RMCM	DWG. CHECKED	12.06.14		
-	20.05.14	FOR AS BUILT	IW	RMCM	PROJECT LEADER	12.06.14		
					INFRASTR'R APP'D			



MANGERE WASTEWATER TREATMENT PLANT
STANDARD MOTOR STARTER SCHEMATICS
VSD SUBMERSIBLE PUMP <70kW

CAD FILE 2010699.006C	DATE 22:06:2017
ORIGINAL SCALE A3	CONTRACT No.
REFERENCE No.	ISSUE
DRAWING No. 2010699	ISSUE C
.006	



ISSUE	DATE	AMENDMENT	BY	APPD.	DESIGNED	DES. CHECKED	DRAWN	DWG. CHECKED	PROJECT LEADER	INFRAS'T'R APP'D	BY	DATE
C	06.17	MINOR CHANGES	R.M		GJ	Rmcm						12.06.14
B	18.10.16	TERMINAL VSD LAYOUT UPDATED	IW	Rmcm								12.06.14
A	24.07.15	NOTES 4 & 5 ADDED	IW	Rmcm								12.06.14
-	20.05.14	FOR AS BUILT	IW	Rmcm								12.06.14

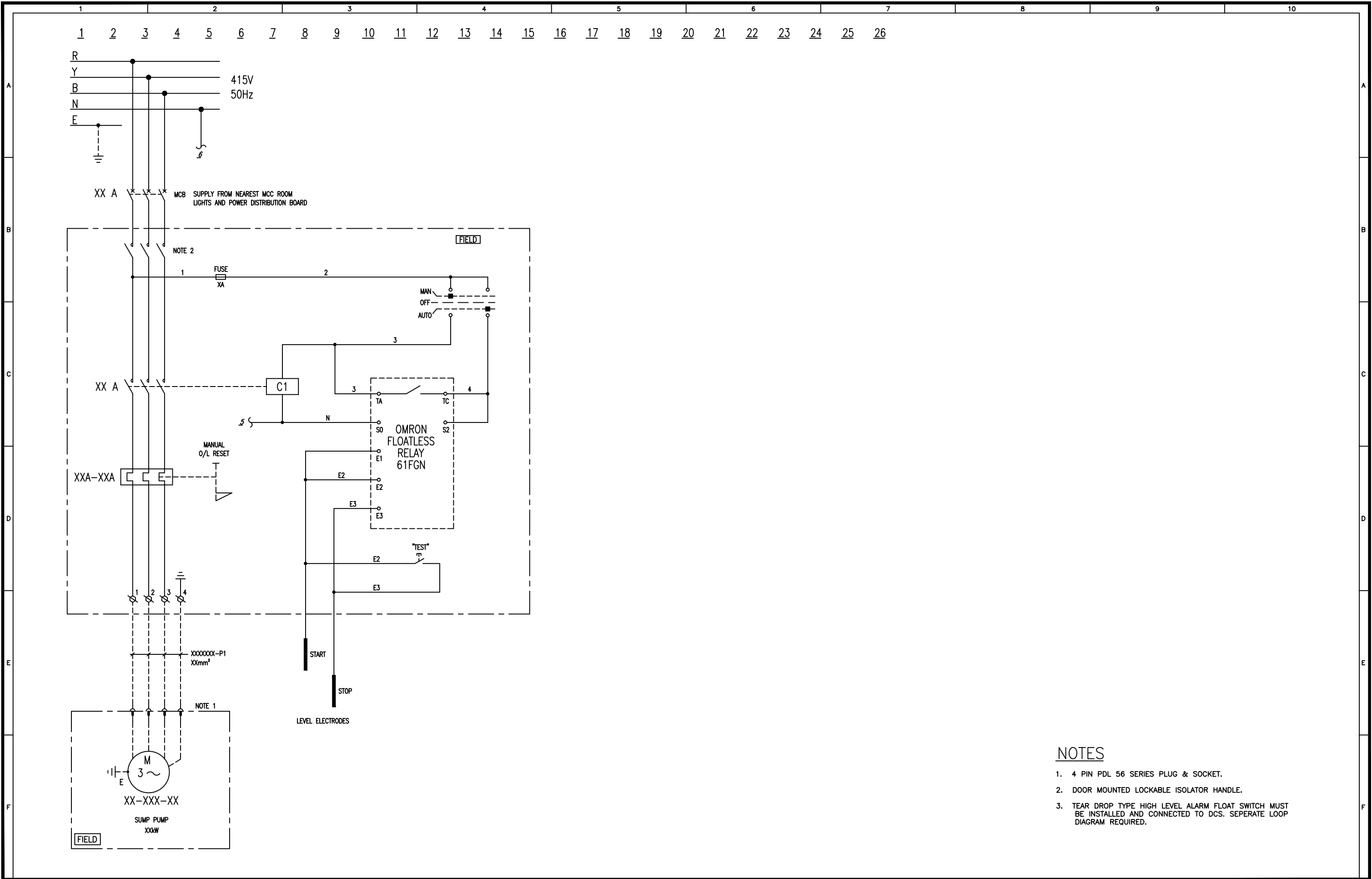
DESIGNED: GJ 12.06.14
 DES. CHECKED: Rmcm 12.06.14
 DRAWN: IW 12.06.14
 DWG. CHECKED: GJ 12.06.14
 PROJECT LEADER: JT 12.06.14
 INFRAS'T'R APP'D: 12.06.14

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MANGERE WASTEWATER TREATMENT PLANT
 STANDARD MOTOR STARTER SCHEMATICS
 VSD SUBMERSIBLE PUMP >70KW

CAD FILE 2010699.007C	DATE 22:06:2017
ORIGINAL SCALE A3	CONTRACT No.
REFERENCE No.	ISSUE
DRAWING No. 2010699	ISSUE C



NOTES

- 4 PIN PDL 56 SERIES PLUG & SOCKET.
- DOOR MOUNTED LOCKABLE ISOLATOR HANDLE.
- TEAR DROP TYPE HIGH LEVEL ALARM FLOAT SWITCH MUST BE INSTALLED AND CONNECTED TO DCS. SEPERATE LOOP DIAGRAM REQUIRED.

ISSUE	DATE	AMENDMENT	BY	APPD.	DESIGNED	DATE
					GJ	12.06.14
					RMcM	12.06.14
					IW	12.06.14
A	06:17	MINOR CHANGES	R.M		GJ	12.06.14
-	20.05.14	FOR AS BUILT	IW	RMcM	JT	12.06.14

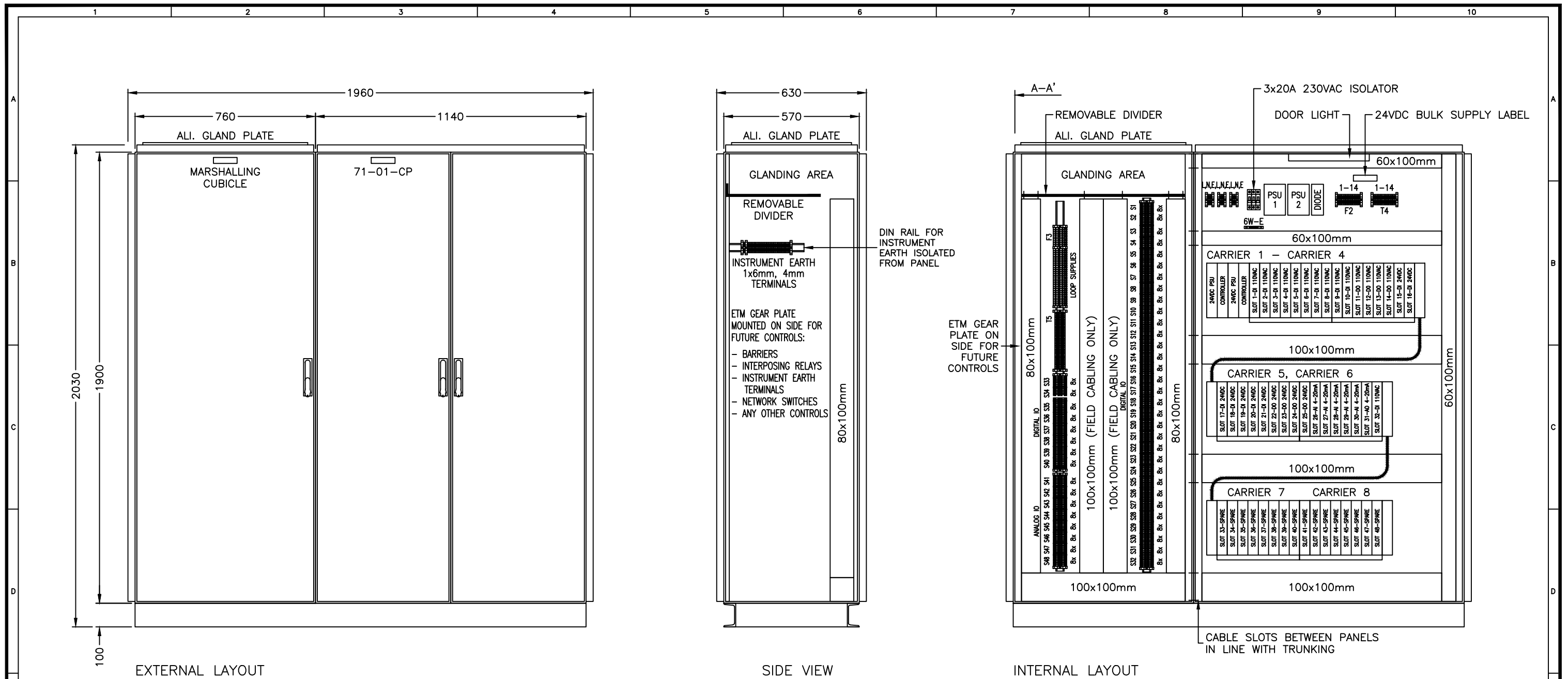
OPERATIONS	INFRASTRUCTURE



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MANGERE WASTEWATER TREATMENT PLANT
STANDARD MOTOR STARTER SCHEMATICS
SUMP PUMP <2.2kW

CAD FILE	DATE	ORIGINAL SCALE	CONTRACT No.
2010699.008A	22:06:2017	A3	
REFERENCE No.	ISSUE		
DRAWING No.	ISSUE		
2010699	.008 A		

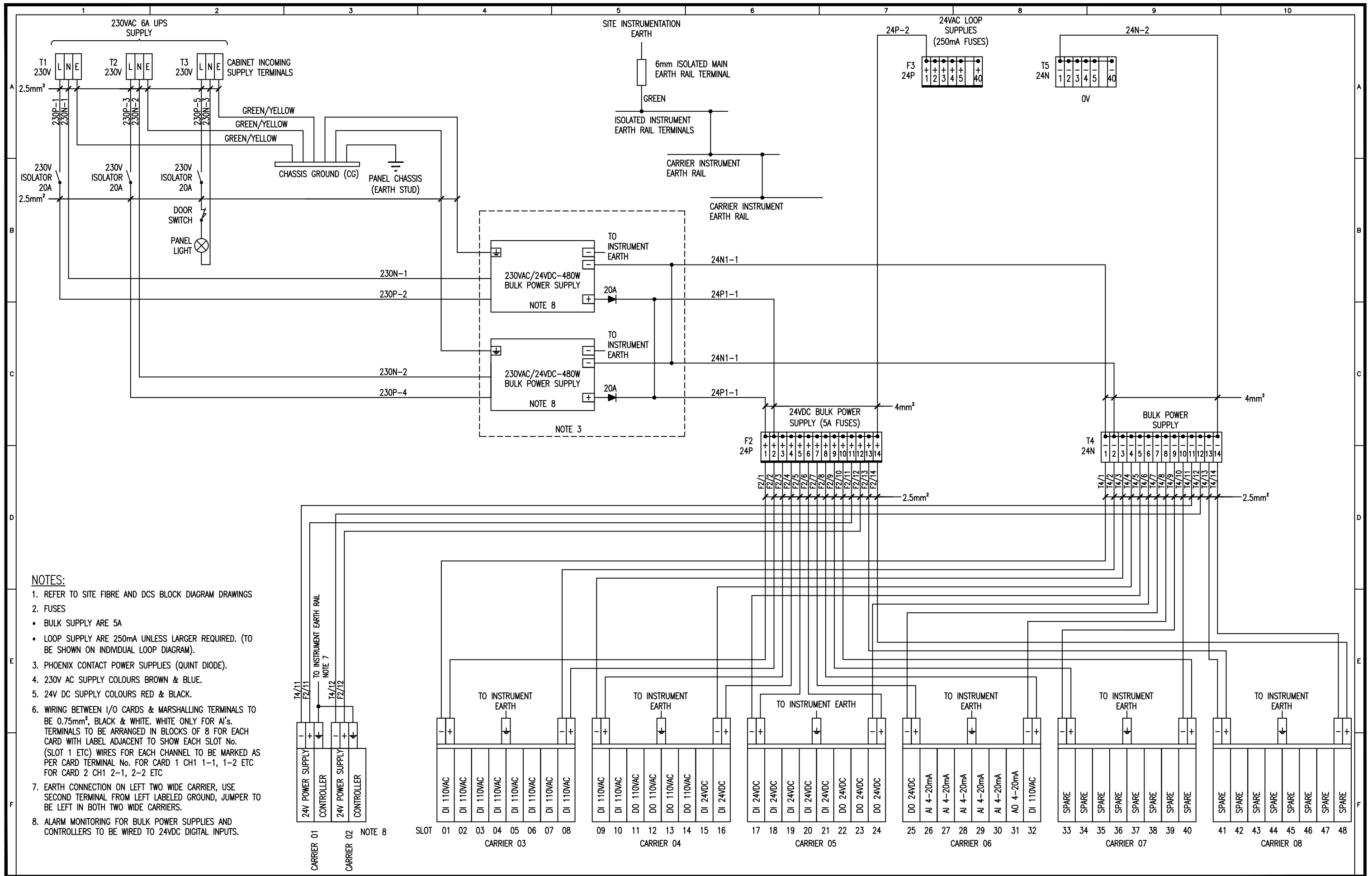


BILL OF MATERIALS			
QTY	UNIT	DESCRIPTION	PART No.
-	-	DCS CABINET	-
1	EA	18W PANEL FLUORESCENT/LED LIGHT	-
1	EA	DOOR OPERATED LIMIT SWITCH	-
2	EA	PHOENIX CONTACT POWER SUPPLY 40A 24VDC SFB	2866789
1	EA	PHOENIX CONTACT QUINT - DIODE/40	2938963
3	EA	230V 20A ISOLATOR	-
1	EA	6 WAY EARTH TERMINAL BAR	-
AS REQ	EA	4mm GREY TERMINALS	CSC4T
AS REQ	EA	6A FUSE TERMINALS	CSFL4U
AS REQ	-	80W x 100H GREY PVC SLOTTED DUCT	-
AS REQ	-	100W x 100H GREY PVC SLOTTED DUCT	-
1	EA	6 WAY EARTH BAR	-
1	EA	48 PORT FIBRE PATCH PANEL (SC CONNECTORS)	-
1	EA	1U RING - TYPE CABLE MANAGEMENT BAR	-
AS REQ	EA	EMERSON NETWORK	-

BILL OF MATERIALS			
QTY	UNIT	DESCRIPTION	PART No.
AS REQ	-	35mm DIN RAIL	-
AS REQ	EA	4mm GREY TERMINALS DOUBLE LEVEL	CDL4U
AS REQ	EA	6mm GREEN/YELLOW TERMINALS	CGT6N
AS REQ	EA	4mm GREEN/YELLOW TERMINALS	CGT4N
AS REQ	EA	2.5 GREY TERMINALS TRI LEVEL (FOR ANALOG INPUTS)	CTL2.5U
2	EA	DELTA S-SERIES PSU	SE 5009
2	EA	DELTA S-SERIES CONTROLLER	SE 3008
AS REQ	EA	DELTA S-SERIES 8 CHANNEL 24VDC DI MODULE (NAMUR)	SE 4001S2T2B1
AS REQ	EA	DELTA S-SERIES 8 CHANNEL 24VDC DI MODULE (ISOLATED)	SE 4001S2T1B1
AS REQ	EA	DELTA S-SERIES 8 CHANNEL 120VAC DI MODULE (ISOLATED)	SE 4001S3T1B1
AS REQ	EA	DELTA S-SERIES 8 CHANNEL 24VDC DO MODULE (HIGH SIDE)	SE 4002S1T2B2
AS REQ	EA	DELTA S-SERIES 8 CHANNEL 120VAC DO MODULE (ISOLATED)	SE 4002S2T1B2
AS REQ	EA	DELTA S-SERIES 8 CHANNEL AI MODULE	SE 4003S2B1
AS REQ	EA	DELTA S-SERIES 8 CHANNEL AO MODULE	SE 4005S2B1
AS REQ	EA	DELTA S-SERIES SERIAL INTERFACE	-

NOTES:
 1. MARSHALLING TERMINAL RAIL FOR DIGITAL ALWAYS TO BE CLOSEST TO DCS SECTION OF PANEL.

DESIGNED	GJ	28.04.17	OPERATIONS		MANGERE WASTEWATER TREATMENT PLANT STANDARD DCS SCHEMATIC TYPICAL LAYOUT	CAD FILE	2010699.009A	DATE	22:06:2017
DES. CHECKED	RMcM	28.04.17				ORIGINAL SCALE	A3	CONTRACT No.	
DRAWN	IW	28.04.17				REFERENCE No.		ISSUE	
DWG. CHECKED	GJ	28.04.17				DRAWING No.	2010699	ISSUE	A
PROJECT LEADER	JT	28.04.17	AMENDMENT						
INFRASTR'R APP'D			BY		APPD.		DATE		



- NOTES:**
- REFER TO SITE FIBRE AND DCS BLOCK DIAGRAM DRAWINGS
 - FUSES
 - BULK SUPPLY ARE 5A
 - LOOP SUPPLY ARE 250mA UNLESS LARGER REQUIRED. (TO BE SHOWN ON INDIVIDUAL LOOP DIAGRAM).
 - PHOENIX CONTACT POWER SUPPLIES (QUINT DIODE).
 - 230V AC SUPPLY COLOURS BROWN & BLUE.
 - 24V DC SUPPLY COLOURS RED & BLACK.
 - WIRING BETWEEN I/O CARDS & MARSHALLING TERMINALS TO BE 0.75mm², BLACK & WHITE. WHITE ONLY FOR AI's. TERMINALS TO BE ARRANGED IN BLOCKS OF 8 FOR EACH CARD WITH LABEL ADJACENT TO SHOW EACH SLOT No. (SLOT 1 ETC) WIRES FOR EACH CHANNEL TO BE MARKED AS PER CARD TERMINAL No. FOR CARD 1 CH1 1-1, 1-2 ETC FOR CARD 2 CH1 2-1, 2-2 ETC
 - EARTH CONNECTION ON LEFT TWO WIDE CARRIER, USE SECOND TERMINAL FROM LEFT LABELED GROUND, JUMPER TO BE LEFT IN BOTH TWO WIDE CARRIERS.
 - ALARM MONITORING FOR BULK POWER SUPPLIES AND CONTROLLERS TO BE WIRED TO 24VDC DIGITAL INPUTS.

ISSUE	DATE	AMENDMENT	BY	APPD.	DESIGNED	DATE	OPERATIONS	INFRASTRUCTURE
					GJ	28.04.17		
					RMcM	28.04.17		
					IW	28.04.17		
A	06:17	MINOR CHANGES	R.M		GJ	28.04.17		
-	28.04.17	FOR AS BUILT	IW	RMcM	JT	28.04.17		



MANGERE WASTEWATER TREATMENT PLANT
STANDARD DCS SCHEMATIC
POWER DISTRIBUTION DIAGRAM

CAD FILE	2010699.010A	DATE	22:06:2017
ORIGINAL SCALE	A3	CONTRACT No.	
REFERENCE No.		ISSUE	
DRAWING No.	2010699	ISSUE	A
	.010		

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