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PROJECT INFORMATION

SCHEME NAME: Establish 400/132kV TRFR at Paulputs Substation (Phase 1)
PROJECT NAME: Establish 400/132kV TRFR at Paulputs Substation (Phase 1)
SUBSTATION NAME: Paulputs
OPERATING UNIT: Western Grid
PROJECT NUMBER: ETPAUL1.D.NC.INT.TE.SU

RELATED/SUPPORTING DOCUMENTS

STATION ELECTRIC DIAGRAM: Pau21P04-SE-D6
CONTROL ROOM LAYOUT: Not available

Revision: 1
Revision Control: Rev. 1 First issue

	Designation	Name	Signature	Date
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AC RETICULATION

From	To	Function	Cable Type	No of
Auxiliary Transformer 1	TRANSFORMER 1 TDB	AC	BVX4QCV	2
AC BOARD	TRANSFORMER 1 TDB	AC	BVX4NCV	2
AC BOARD	AC DISTRIBUTION BOARD	AC	BVX4NCV	2
AC BOARD	110V BATTERY CHARGERS MAIN 1	AC	BVX4LCV	1
AC BOARD	110V BATTERY CHARGERS MAIN 2	AC	BVX4LCV	1
AC BOARD	50V BATTERY CHARGERS MAIN 1	AC	BVX4LCV	1
AC BOARD	50V BATTERY CHARGERS MAIN 2	AC	BVX4LCV	1
AC BOARD	FLOOD LIGHTING BOARD	AC	BVX4NCV	1
110V BATTERIES 6JB-9100	110V BATTERY CHARGERS MAIN 1	DC	BVX2HCV	1
110V BATTERIES 6JB-9100	110V BATTERY CHARGERS MAIN 2	DC	BVX2HCV	1
50V BATTERIES 6JB-9100	50V BATTERY CHARGERS MAIN 1	DC	BVX2HCV	1
50V BATTERIES 6JB-9100	50V BATTERY CHARGERS MAIN 2	DC	BVX2HCV	1
TRANSFORMER 1 TDB	TRANSFORMER 1 MARSHALLING KIOSK	AC	BVX4LCV	1
TRANSFORMER 1 TDB	TRANSFORMER 1 TAP CHANGE DRIVE	AC	BVX4ECV	1
AC BOARD	PLUG BOX	AC	BVX4LCV	1
PLUG BOX (new)	PLUG BOX	AC	BVX4HCV	1
AC BOARD	IDF	Alarm	TPH10AX	1

400kV FEEDER 1 BREAKER JB

JB-6JB-9100	CB 1-R	Status	BVX12DCV	1
JB-6JB-9100	CB 1-W	Status	BVX12DCV	1
JB-6JB-9100	CB 1-B	Status	BVX12DCV	1
JB-6JB-9100	Iso BB1	Status	BVX7DCV	1
JB-6JB-9100	Iso BB2 R	Status	BVX7DCV	1
JB-6JB-9100	Iso BB2 W	Status	BVX7DCV	1
JB-6JB-9100	Iso BB2 B	Status	BVX7DCV	1
JB-6JB-9100	Iso T R	Status	BVX7DCV	1
JB-6JB-9100	Iso T W	Status	BVX7DCV	1
JB-6JB-9100	Iso T B	Status	BVX7DCV	1
JB-6JB-9100	Iso L	Status	BVX7DCV	1
JB-6JB-9100	ESCB1	Status	BVX7DCV	1
JB-6JB-9100	ESCB2	Status	BVX7DCV	1
JB-6JB-9100	ESL	Status	BVX7DCV	1
JB-6JB-9100	CT1-R	CT Cores	BVX7DCV	1
JB-6JB-9100	CT1-W	CT Cores	BVX7DCV	1
JB-6JB-9100	CT1-B	CT Cores	BVX7DCV	1
JB-6JB-9100	VTL	DC, MCB, Trip	BVX2ECV	1

FEEDER 1 400kV BREAKER JB COMMON

JB-COM	CB 1-R	Heater Supply R	BVX2ECV	1
JB-COM	CB 1-W	Heater Supply W	BVX2ECV	1
JB-COM	CB 1-B	Heater Supply B	BVX2ECV	1
JB-COM	CB 1-R	Spring Rwd,Control & Motor	BVX19DCV	1
JB-COM	CB 1-W	Spring Rwd,Control & Motor	BVX19DCV	1
JB-COM	CB 1-B	Spring Rwd,Control & Motor	BVX19DCV	1
JB-COM	Iso 1	Heater Supply	BVX2ECV	1
JB-COM	Iso 1	Control & Motor	BVX12DCV	1
JB-COM	Iso BB2 R	Heater Supply	BVX2ECV	1
JB-COM	Iso BB2 W	Heater Supply	BVX2ECV	1
JB-COM	Iso BB2 B	Heater Supply	BVX2ECV	1
JB-COM	Iso T R	Heater Supply	BVX2ECV	1
JB-COM	Iso T W	Heater Supply	BVX2ECV	1
JB-COM	Iso T B	Heater Supply	BVX2ECV	1
JB-COM	Iso BB2 R	Control & Motor	BVX12DCV	1
JB-COM	Iso BB2 W	Control & Motor	BVX12DCV	1
JB-COM	Iso BB2 B	Control & Motor	BVX12DCV	1
JB-COM	Iso T R	Control & Motor	BVX12DCV	1
JB-COM	Iso T W	Control & Motor	BVX12DCV	1
JB-COM	Iso T B	Control & Motor	BVX12DCV	1
JB-COM	Iso L	Heater Supply	BVX2ECV	1
JB-COM	Iso L	Control & Motor	BVX12DCV	1
JB-COM	ESBB2	Heater Supply	BVX2ECV	1
JB-COM	ESCB1	Heater Supply	BVX2ECV	1
JB-COM	ESCB2	Heater Supply	BVX2ECV	1
JB-COM	ESL	Heater Supply	BVX2ECV	1
JB-COM	Plug Box	AC Heater & Lamp Supply	BVX2ECV	1
JB-COM	DC Board	DC Motor & SR Supply	BVX4HCV	1
JB-COM	VTBB2	AC HEATER	BVX2ECV	1

400kV FEEDER 1 PROTECTION PANEL MAIN 1

Feeder 1 RP-6JB-9100	Line VT JB	Line VT	BVX4ECV	1
Feeder 1 RP-6JB-9100	DC Board	DC Supply	BVX2ECV	1
Feeder 1 RP-6JB-9100	AC Board	230VAC EL	BVX2ECV	1
Feeder 1 RP-6JB-9100	Breaker JB 6JB-9100	Line CT	BVX4ECV	1
Feeder 1 RP-6JB-9100	TPE F/O Panel	TPE	8 SM HDD	1
Feeder 1 RP-6JB-9100	Buszone Panel	Buszone	BVX7DCV	1

400kV FEEDER 1 PROTECTION PANEL MAIN 2

Feeder 1 RP-6JB-9100	Line VT JB	Line VT	BVX4ECV	1
Feeder 1 RP-6JB-9100	DC Board	DC Supply	BVX2ECV	1
Feeder 1 RP-6JB-9100	AC Board	230VAC EL	BVX2ECV	1
Feeder 1 RP-6JB-9100	Feeder 1 Breaker JB 6JB-9100	Line CT	BVX4ECV	1
Feeder 1 RP-6JB-9100	TPE Panel	TPE	18Z	1

Feeder 1 RP-6JB-9100	Buszone Panel	Buszone	BVX7DCV	1
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TPE PANEL FEEDER 1

TPE PANEL	LME 1	Teleprotection	Coax	1
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TRANSFORMER 1 JB

JB-6JB-9200	MK	DC	BVX7DCV	1
JB-M 2	MK	DC	BVX19DCV	1
JB-M 2	MK	DC	BVX19DCV	1
JB-COM	MK	DC	BVX19DCV	1
JB-COM	MK	DC	BVX19DCV	1
JB-6JB-9200	MK	CT	BVX19DCV	1
JB-6JB-9200	MK	CT	BVX19DCV	1
JB-6JB-9200	MK	CT	BVX19DCV	1
JB-6JB-9200	MK	CT	BVX19DCV	1
JB-COM	DGA	DC	BVX7DCV	1
MK	DGA	AC	BVX4ECV	1
MK	Drykeep	AC	BVX4ECV	1
JB-COM	Sergi	DC	BVX19DCV	1
JB-6JB-9200	TCD	DC	BVX19DCV	1
JB-6JB-9200	TCD	DC	BVX19DCV	1
JB-COM	Aux Trfr	Aux Trfr	BVX12DCV	1
JB-COM	MK	Cooler Control	BVX19DCV	1
JB-6JB-9200	Trfr RP- 6JB-9100	DC	BVX2ECV	1
JB-6JB-9200	Trfr RP- 6JB-9100	DC	BVX2ECV	1
JB-COM	PLUGBOX	AC	BVX2ECV	1
MK	SERGI	AC	BVX4ECV	1
JB-6JB-9200	DIP	FO	12MM HDD	1
JB-6JB-9200	DIP	FO	12MM HDD	1
JB-6JB-9200	Trfr TCP	FO	12MM HDD	1

TRANSFORMER 1 400kV BREAKER JB HV

JB-6JB-9100	CB 1-R	Status	BVX12DCV	1
JB-6JB-9100	CB 1-W	Status	BVX12DCV	1
JB-6JB-9100	CB 1-B	Status	BVX12DCV	1
JB-6JB-9100	Iso BB1 R	Status	BVX7DCV	1
JB-6JB-9100	Iso BB1 W	Status	BVX7DCV	1
JB-6JB-9100	Iso BB1 B	Status	BVX7DCV	1
JB-6JB-9100	Iso BB2	Status	BVX7DCV	1
JB-6JB-9100	ESCB2	Status	BVX7DCV	1
JB-6JB-9100	EST	Status	BVX7DCV	1
JB-6JB-9100	CT1-R	CT Cores	BVX7DCV	1
JB-6JB-9100	CT1-W	CT Cores	BVX7DCV	1
JB-6JB-9100	CT1-B	CT Cores	BVX7DCV	1
JB-6JB-9100	VTBB1	DC,MCB,Trip	BVX2ECV	1
JB-6JB-9100	TRFR 1 RP 6JB-9100	DC Supply,EM Trip	BVX12ECV	1

JB-6JB-9100	TRFR 1 RP 6JB-9100	FO	12MM HDD	1
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TRANSFORMER 1 400kV BREAKER JB MV

JB-6JB-9100	CB 1-R	Status	BVX12DCV	1
JB-6JB-9100	CB 1-W	Status	BVX12DCV	1
JB-6JB-9100	CB 1-B	Status	BVX12DCV	1
JB-6JB-9100	Iso BB1 R	Status	BVX7DCV	1
JB-6JB-9100	Iso BB1 W	Status	BVX7DCV	1
JB-6JB-9100	Iso BB1 B	Status	BVX7DCV	1
JB-6JB-9100	Iso BB2	Status	BVX7DCV	1
JB-6JB-9100	Iso T	Status	BVX7DCV	1
JB-6JB-9100	ESCB2	Status	BVX7DCV	1
JB-6JB-9100	EST	Status	BVX7DCV	1
JB-6JB-9100	CT1-R	CT Cores	BVX7DCV	1
JB-6JB-9100	CT1-W	CT Cores	BVX7DCV	1
JB-6JB-9100	CT1-B	CT Cores	BVX7DCV	1
JB-6JB-9100	TRFR 1 RP 6JB-9100	DC Supply,EM Trip	BVX12ECV	1
JB-6JB-9100	TRFR 1 RP 6JB-9100	FO	12MM HDD	1

TRANSFORMER 1 400kV BREAKER JB COMMON

JB-COM	CB 1-R	Heater Supply R	BVX2ECV	1
JB-COM	CB 1-W	Heater Supply W	BVX2ECV	1
JB-COM	CB 1-B	Heater Supply B	BVX2ECV	1
JB-COM	CB 1-R	Spring Rwd,Control & Motor	BVX19DCV	1
JB-COM	CB 1-W	Spring Rwd,Control & Motor	BVX19DCV	1
JB-COM	CB 1-B	Spring Rwd,Control & Motor	BVX19DCV	1
JB-COM	Iso BB1 R	Heater Supply	BVX2ECV	1
JB-COM	Iso BB1 W	Heater Supply	BVX2ECV	1
JB-COM	Iso BB1 B	Heater Supply	BVX2ECV	1
JB-COM	Iso BB1 R	Control & Motor	BVX12DCV	1
JB-COM	Iso BB1 W	Control & Motor	BVX12DCV	1
JB-COM	Iso BB1 B	Control & Motor	BVX12DCV	1
JB-COM	ESCB2	Heater Supply	BVX2ECV	1
JB-COM	ES2T	Heater Supply	BVX2ECV	1
JB-COM	Plug Box	AC Heater & Lamp Supply	BVX2ECV	1
JB-COM	DC Board	DC Motor & SR Supply	BVX4HCV	1
JB-COM	VTBB	AC HEATER	BVX2ECV	1

TRANSFORMER 1 PROTECTION PANEL MAIN 1

Trfr RP-6JB-9100	400kV BB 1 VT JB	HV VT	BVX4ECV	1
Trfr RP-6JB-9100	132kV Trfr VT JB	MV Trfr VT	BVX4ECV	1
Trfr RP-6JB-9100	Trfr JB	REF CT	BVX4ECV	1
Trfr RP-6JB-9100	Trfr JB	Tertiary CT	BVX4ECV	1
Trfr RP-6JB-9100	400kV Buszone Panel	HV Buszone	BVX7DCV	1
Trfr RP-6JB-9100	132kV Buszone Panel	MV Buszone	BVX7DCV	1
Trfr RP-6JB-9100	DC Board	DC Supply	BVX2ECV	1

Trfr RP-6JB-9100	AC Board	230V AC EL	BVX2ECV	1
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TRANSFORMER 1 PROTECTION PANEL MAIN 2

Trfr RP-6JB-9100	400kV BB 1 VT JB	HV VT	BVX4ECV	1
Trfr RP-6JB-9100	132kV Trfr VT JB	MV Trfr VT	BVX4ECV	1
Trfr RP-6JB-9100	Trfr JB	REF CT	BVX4ECV	1
Trfr RP-6JB-9100	Trfr JB	Tertiary CT	BVX4ECV	1
Trfr RP-6JB-9100	400kV Buszone Panel	HV Buszone	BVX7DCV	1
Trfr RP-6JB-9100	132kV Buszone Panel	MV Buszone	BVX7DCV	1
Trfr RP-6JB-9100	DC Board	DC Supply	BVX2ECV	1
Trfr RP-6JB-9100	AC Board	230VAC EL	BVX2ECV	1

FIBRE OPTIC TELEPROTECTION PANEL

F/O TPE PANEL	Main 1 DC Board 50V	Main 1 DC Supply	BVX2ECV	1
F/O TPE PANEL	Main 2 DC Board 50V	Main 2 DC Supply	BVX2ECV	1
F/O TPE PANEL	GANTRY FEEDER 1	TELEPROTECTION	24 SM HDD	1

COMMON EQUIPMENT CABLING REQUIREMENTS

400kV BUSZONE

Buszone	Main 1 DC Board	Main 1 DC Supply	BVX2ECV	1
Buszone	Main 2 DC Board	Main 2 DC Supply	BVX2ECV	1
Buszone	AC Board	230VAC EL Supply	BVX2ECV	1
Buszone	AC Board	230VAC Supply	BVX2ECV	1
Buszone	Transformer 1 Breaker JB 6JB-9100	Trfr 1 CT	BVX4ECV	1
Buszone	Feeder 1 Breaker JB 6JB-9100	Feeder 2 CT	BVX4ECV	1
Buszone	Transformer 1 Breaker JB Com	Trfr 1 Isolator Status	BVX4ECV	1
Buszone	Feeder 1 Breaker JB Com	Feeder 1 Isolator Status	BVX4ECV	1
Buszone	GB Transformer 1 Breaker JB Com	Trfr 1 Isolator Status	BVX4ECV	1
Buszone	IDF	ALARM	TPH10AX	1
400kV Buszone	Common Equipment Panel	FO	12MM HDD	1

132kV BUSZONE

Buszone	Main 1DC Board	Main 1 DC Supply	BVX2ECV	1
Buszone	Main 2DC Board	Main 2 DC Supply	BVX2ECV	1
Buszone	AC Board	230VAC EL Supply	BVX2ECV	1
Buszone	AC Board	230VAC Supply	BVX2ECV	1
Buszone	Feeder 1 Breaker JB 6JB-9100	Feeder 1 CT	BVX4ECV	1
Buszone	Feeder 2 Breaker JB 6JB-9101	Feeder 1 CT	BVX4ECV	1
Buszone	Feeder 3 Breaker JB 6JB-9102	Feeder 1 CT	BVX4ECV	1
Buszone	Feeder 4 Breaker JB 6JB-9100	Feeder 2 CT	BVX4ECV	1
Buszone	Feeder 5 Breaker JB 6JB-9100	Feeder 6 CT	BVX4ECV	1

Buszone	BC A Breaker JB 6JB-9100	BC A CT	BVX4ECV	1
Buszone	Trfr 11 MV Breaker JB 6JB-9100	Trfr 11 MV CT	BVX4ECV	
Buszone	Trfr 12 MV Breaker JB 6JB-9100	Trfr 12 MV CT	BVX4ECV	
Buszone	Feeder 1 Breaker JB Com	Feeder Isolator Status	BVX7DCV	1
Buszone	Feeder 2 Breaker JB Com	Feeder Isolator Status	BVX7DCV	1
Buszone	Feeder 6 Breaker JB Com	Feeder Isolator Status	BVX7DCV	1
Buszone	BC A Breaker JB Com	BC A Isolator/ Breaker Status	BVX12DCV	1
Buszone	Trfr 11 MV Breaker JB Com	Trfr 1 MV Isolator Status	BVX7DCV	1
Buszone	Trfr 12 MV Breaker JB Com	Trfr 2 MV Isolator Status	BVX7DCV	1
Buszone	IDF	ALARMS	TPH10AX	1
132kV Buszone	Common Equipment Panel	FO	12MM HDD	1

INTERNAL TARIFF METERING PANEL

ITM Panel	DC Board	DC Supply	BVX2ECV	1
ITM Panel	DC Board	DC Supply	BVX2ECV	
ITM Panel	Trfr 1 MV Breaker JB 6JB-9100	Trfr 1 MV CT	BVX4ECV	
ITM Panel	Trfr 2 MV Breaker JB 6JB-9100	Trfr 2 MV CT	BVX4ECV	1
ITM Panel	Trfr 1 MV VT JB	Trfr 1 MV VT	BVX4ECV	1
ITM Panel	Trfr 2 MV VT JB	Trfr 2 MV VT	BVX4ECV	1
ITM Panel	132kV Measurements Panel	Trfr 1 MV CT	BVX4ECV	1
ITM Panel	132kV Measurements Panel	Trfr 2 MV CT	BVX4ECV	1
ITM Panel	Common Equipment Panel	FO	12MM HDD	1
ITM Panel	IDF	Alarm	TPH10AX	1

400kV DISTURBANCE RECORDER PANEL

DFR	DC Board	DC Supply	BVX2ECV	1
DFR	DC Board	DC Supply	BVX2ECV	1
DFR	BB 1 VT JB	BB 1 VT	BVX4ECV	
DFR	BB 2 VT JB	BB 2 VT	BVX4ECV	
DFR	Transformer 1 Breaker JB 6JB-9100	Trfr 1 CT	BVX4ECV	
DFR	Feeder 1 Breaker JB 6JB-9100	Feeder 1 CT	BVX4ECV	1
DFR	GA Feeder 1 Line VT JB	Feeder 1 VT	BVX4ECV	1
DFR	Transformer 1 Breaker JB 6JB-9100	Trfr 1 CT	BVX4ECV	1
DFR	Common Equipment Panel	FO	12MM HDD	1
DFR	IDF	Alarm	TPH10AX	1

TAP CHANGE PANEL

TCP	DC Board 6JB-9100	DC Supply	BVX2ECV	1
TCP	DC Board 6JB-9100	DC Supply	BVX2ECV	1
TCP	MEAS PANEL	VT INPUT	BVX4ECV	1
TCP	MEAS PANEL	CT INPUT	BVX4ECV	1

TCP	Common Equipment Panel	FO	12MM HDD	1
TCP	IDF	Alarm	TPH10AX	1

				1
ADDITIONAL F/O CABLES				1

FSP 1	FSP 2	FO	12MM HDD	1
FSP 1	GATEWAY PANEL 1	FO	12MM HDD	1
FSP 2	GATEWAY PANEL 2	FO	12MM HDD	1
FSP 1	Common Equipment Panel	FO	12MM HDD	1
FSP 2	Common Equipment Panel	FO	12MM HDD	1

				1
50V DC BOARD				1

50V DC BOARD	400kV F/O TPE Panel	DC Supply 6JB-9100	BVX2ECV	1
50V DC BOARD	Common Equipment Panel	DC Supply 6JB-9100	BVX2ECV	1
50V DC BOARD	Gateway Panel 1	DC Supply 6JB-9100	BVX2ECV	1
50V DC BOARD	Gateway Panel 2	DC Supply 6JB-9100	BVX2ECV	1
50V DC BOARD	FSP 1	DC Supply 6JB-9100	BVX2ECV	1
50V DC BOARD	FSP 2	DC Supply 6JB-9100	BVX2ECV	1
50V DC BOARD	400kV FDR 1 TPE Panel	DC Supply 6JB-9100	BVX2ECV	1
50V DC BOARD	Eskom Telecoms Panel 1	DC Supply 6JB-9100	BVX2ECV	1
50V DC BOARD	IDF	Alarm	TPH10AX	1

				1
110V DC BOARD				1

110V DC BOARD 6JB-9100	IDF	Alarm	TPH10AX	1
				1

ADDITIONAL VTJB CABLES

400kV BUSBAR 1

BB1 VTJB	CVT - R	BB1 VT RED	BVX7ECV	1
BB1 VTJB	CVT- W	BB1 VT WHITE	BVX7ECV	1
BB1 VTJB	CVT - B	BB1 VT BLUE	BVX7ECV	1

				1
400kV BUSBAR 2				1

BB2 VTJB	CVT - R	BB2 VT RED	BVX7ECV	1
BB2 VTJB	CVT- W	BB2 VT WHITE	BVX7ECV	1
BB2 VTJB	CVT - B	BB2 VT BLUE	BVX7ECV	1

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Connector 1

BB1 VTJB1	CVT - R	BB1 VT RED	BVX4ECV	1
BB1 VTJB1	CVT- W	BB1 VT WHITE	BVX4ECV	1
BB1 VTJB1	CVT - B	BB1 VT BLUE	BVX4ECV	1
BB1 VTJB1	PLUG BOX	HEATER	BVX2ECV	1

				1
Connector 2				1

BB1 VTJB2	CVT - R	BB1 VT RED	BVX4ECV	1
BB1 VTJB2	CVT- W	BB1 VT WHITE	BVX4ECV	1
BB1 VTJB2	CVT - B	BB1 VT BLUE	BVX4ECV	1
BB1 VTJB2	PLUG BOX	HEATER	BVX2ECV	1

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