

TRANSMISSION PROJECT – ESSELEN-JUPITER 88kV FEEDER BYPASS

ESSELEN 88KV YARD:ASSET SPECIFICATION

STATION ELECTRIC DIAGRAM : 0.18/6462 Rev 44(current)
KEY PLAN : 0.18/17324 Sh 1 Rev 2(current)

1. PROJECT DESCRIPTION

To construct an 88kV emergency bypass supply through to Jupiter Substation in the event of the loss of 275kV supply. 88kV to be supplied(on a down-rated basis) by utilizing 275kV Apollo infeed line; 275kV Busbar 2 Section 2; the current 275kV Jupiter Feeder and 275kV line.

2. SUBSTATION LAYOUT DESIGN AND APPLICATIONS

2.1 Philosophy of Design

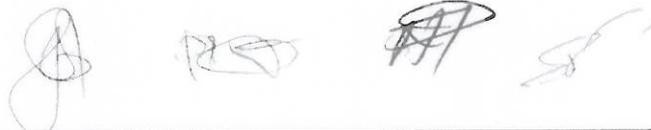
In the event of an emergency when 275kV cannot be supplied from Esselen to Jupiter, a contingency supply of 88kV needs to be sourced. The supply will be taken from the 88kV Feeder 11(SAR Modder 2 Tee supply – which will be interrupted during this emergency), which will connect on to the incoming 275kV line from Apollo(this line to be isolated at Apollo-end for duration of emergency). Section 2 of 275kV Busbar 2 will be dedicated for the 88kV supply; which is then fed through the 275kV Feeder 3(Jupiter 1), and out to Jupiter.

2.1.1 The 275kV Yard

The 275kV busbar system comprises two normal busbars (No 1 and No 2) with two Bus Couplers (A and B), as well as a Bus Section on No 2 Busbar. The 275kV Busbars are constructed as an overhead strung Busbar system, consisting of 3 x 800mm² flexible conductor bundle per phase. The bypass supply from the 88kV yard will be brought in on the 275kV Apollo line (Feeder 4), and onto section 2 of 275kV Busbar 2; this will then be fed out through Feeder 3 to Jupiter.

2.1.2 The 88kV Yard

The 88kV busbar system comprises two normal busbars (No 1 and No 2) with a single Bus Coupler (A). The 88kV Busbars are constructed as an overhead strung Busbar system, consisting of 2 x 800mm² flexible conductor bundle per phase. The 88kV supply from Feeder 11 would be diverted from SAR Modder 2 Tee, to connect to the incoming Apollo line.



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No work is to be carried out within either the 88kV or 275kV Yards; rather, the following work is to be performed in the open terrace section just outside the 88kV Yard:

- 88kV Isolator for interruption to SAR Modder 2 Tee.
- Tee-off stringing from 88kV Feeder 11 line to a 275kV Isolator, to connect on to the 275kV Apollo line overhead.

2.2 Civil Works

Provide foundations for the two Isolators and related PI supports steelwork. This area is to be fenced off as a live chamber, with yard stone. Special attention to be given to soil type in immediate area, since a "soil raft" is to be created due to the dolomitic conditions. Earth-Tails to be connected back to the main Earth Mat just outside the 88kV Yard.

2.2.1 Geo-technical survey

This survey may be necessary as per the dolomitic conditions mentioned in item 2.2.

2.2.2 Earthworks

As evidenced in items 2.2 & 2.2.1

2.2.3 Buildings

None.

2.2.4 Foundations, Plinths, and Trenches

To provide foundations as per ByPass Layout drg and related Std Foundation drg's.

2.2.5 Earth-mat

ByPass equipment as per 2.1.2 to be connected through to 88kV Yard.

2.2.6 Fencing

As per 2.2 a security fence to be provided. To be shown on ByPass Layout.

2.2.7 Roads

None.

2.2.8 Drainage

None.



2.3 Structural Steel

Supply and erect the following steelwork:

- 17 x Medium Equipment supports and Top Caps for 275kV Post Insulators
- 12 x Medium Equipment supports and Top Caps for 88kV Post Insulators

2.4 Primary Plant

All primary plant creepage is to be based on 25mm/kV.

3 PLANT

System Voltage (kV)	Rupturing Capacity (kA,min)	BIL (kV,min)	Creepage (mm/kV,min)	
275	50	1050	25	
88	40	380	25	

3.1 88KV BYPASS – JUST OUTSIDE 88KV YARD

3.1.1 PRIMARY PLANT

- a) 1 x 275kV Isolator 0ES 3150A 50kA 31mm/kV
- b) 1 x 88kV Isolator 0ES 2500A 40kA 25mm/kV
- c) 17 x 275kV Post Insulator C6-1175 25mm/kV
- d) 12 x 132kV Post Insulator C4-550 25mm/kV
- e) Labels
- f) 2 x Bull Conductor (at 275kV Isolator)
- g) 1 x Centipede Conductor (at 88kV Isolator)

3.1.2 SECONDARY PLANT

3.1.2 a) Protection

Protection settings to be changed according to ByPass conditions.

3.1.2 b) Control

3.1.2 c) Measurements

3.1.2 d) Telecommunication

4 COMMON YARD

4.1 Labels

- a) Phasing Discs
- b) Busbar Labels

4.2 Safety (Control Room)

- a) None

4.2.1 Primary Plant

- a) None in the common yard

4.2.2 Busbar

- a) Aluminium Tubes ($\phi 250 \times 6WT$) for 275kV ByPass connection
- b) Aluminium Tubes ($\phi 200 \times 8WT$) for 88kV ByPass connection

4.2.3 AC Reticulation

- a) None

4.2.4 OPGW

- a) None

4.2.5 Control and Battery Room

4.2.5.1 Furniture

- a) Existing

4.2.5.2 Protection

- a) Existing 275kV and 88kV Bus Zone Schemes to be reviewed and modified where necessary

4.2.5.3 Telecommunications

- a) None

4.2.5.4 Control

- a) None

4.2.5.5 Metering

- a) None

4.2.5.6 DC and Standby

- a) None

4.2.5.6.1 Control Room

- a) None



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4.2.5.6.1 a) 110V DC Systems

None

4.2.5.6.1 b) 50V DC Systems

None

4.2.5.7 Load shedding

a) None

5 SECURITY

Existing

6 EARTHING

275kV and 88kV Earthing to be rated for 50kA and 40kA respectively

7 TRANSPORT

None required

8 EMERGENCY PREPAREDNESS PLAN PROCEDURES

These need to be assessed and revised in accordance with various possible emergencies.

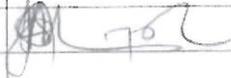
Revision Control

ESSELEN BYPASS: ASSET SPECIFICATION

Rev No	Description	Responsible	Date
0	Initial scope of work	Emlyn Buchler	26-05-2011



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SIGN OFF DOCUMENT : ESSELEN BYPASS			
DISCIPLINE	NAME	DATE	SIGNATURE
Project Management	Nkibi Nkwana	13/09/2011	
Project Management - Civil			
Expansion Planning			
Substation Design:	Phineas Tlhatlhetji	13/09/2011	
• Electric (CED)			
• CED Electrical			
• Civil (CED)			
• Application			
Secondary Application:	Leon Kotze	13/9/2011	
• Protection			
• Control			
• Measurement			
• Telecommunication			
• DC & Standby			
Substation Technology:	Sibongile Maphosa	13/09/2011	
National Control:			
• System Operations			
Region:			
• Secondary Plant			
• Primary Plant			
• Performance & Planning			