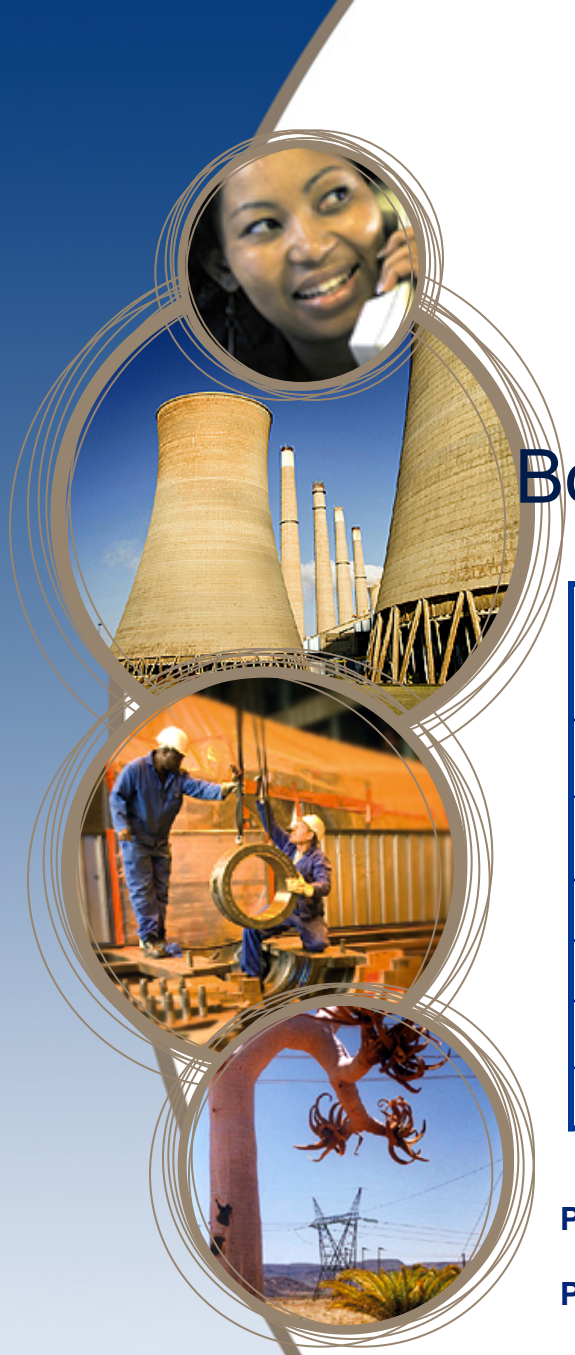


Northern Region - TEC

Boynton Investments (Pty) Ltd

Project Number	Project Name	CRA Form Approved Yes/No	DRA Form ready for support at TEF Yes / No
BoynMpat on KCD 00001	Lebowa 132kV feeder bay	**Yes**	**No**
BoynMpat on KCD 00002	Voorspoed 132kV feeder bay	**Yes**	**No**
BoynMpat on KCD 00003	Lebowa Boynton 132kV line	**Yes**	**No**
BoynMpat on KCD 00004	Voorspoed Boynton 132kV line	**Yes**	**No**
BoynMpat on KCD 00005	Boynton 132/11kV substation	**Yes**	**No**
		Yes	**No**

Presenter Name: Sam Hlungwani

Contact Details:082 468 7394

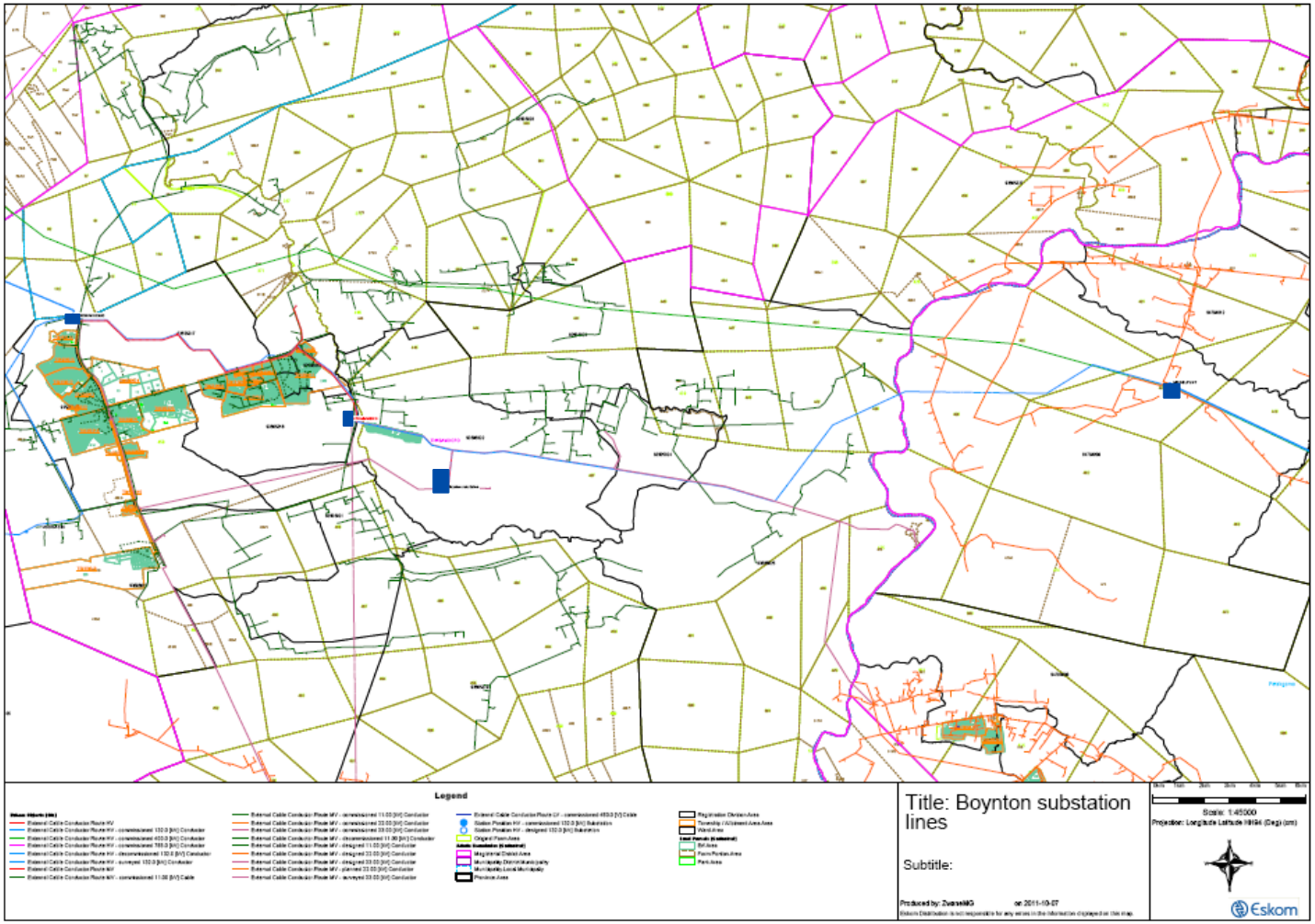
Presentation Date: 29 September 2011

Time Required:20

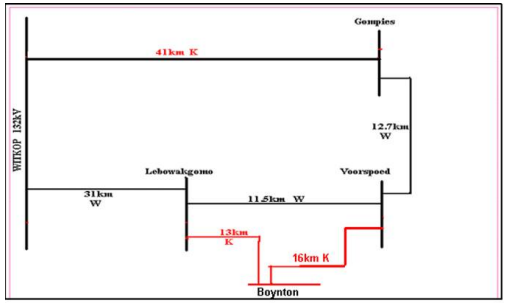
Executive Summary

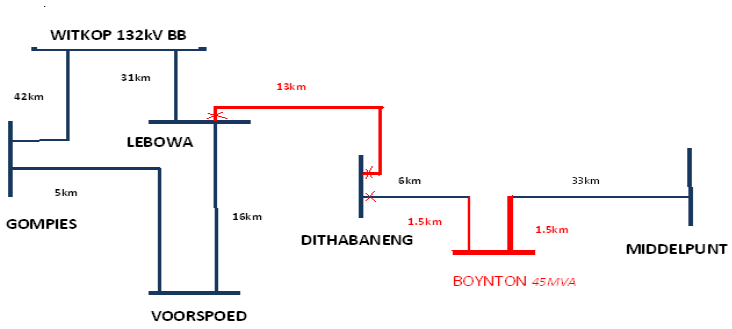
- Customer Need:
  - Boynton Mphahlele require 46.5MVA for underground mining and concentrator.
  - Standard & PF (Megaflex tariff)
  - **Need date:**
  - January 2013
- Customer Overview:
  - Type of Business: Mining and Processing
  - Market (commodity) overview: Platinum
  - Customer financial viability: Existing Eskom customer
- Decision Required:
  - TEF Approval for final route to Boynton Mine

Location of Project



PRC Information





Network Capability Mphahlele	Value
Maximum 1-Φ Fault Level	5.59 kA @ 132kV
Maximum 3-Φ Fault Level	6.86 kA @ 132kV
Maximum 1-Φ Fault Level	0.39 kA @ 11kV
Maximum 3-Φ Fault Level	22.72 kA @ 11kV

Area Load Forecast

Substation	2007	2008	2009	2012	2015	2020
Lebowakgomo	34.2	37.9	40.5	47.7	53.4	62.3
Gompies	8.3	8.7	9.1	10.2	10.5	11.7
Voorspoed	25	25	25	25	25	25
*Dwaalkop	0	5	10	45	45	45
*Boynton	0	5	55	55	55	55

MPHAHLELE PROJECT

Seven year consumption forecast:

Year	1	2	3	4	5 to 7
GWh	27 988	55 100	155 753	376 512	407 165

Both Lines in Service

Substation	Voltage (132kV) pu	3 Phase (kA)	1 Phase (kA)
Boynton	0.95	5.51	6.1
Middlepunt	0.96	7.44	7.44
Dithabaneng	0.95	5.53	6.36
Lebowa	0.96	6	6.53

Breaker open at Dithabaneng on Boynton Dithabaneng Line

Substation	Voltage (132kV) pu	3 Phase (kA)	1 Phase (kA)
Boynton	0.94	2.89	3.15
Middlepunt	0.95	6.2	6.35
Dithabaneng	0.96	3.05	3.68
Lebowa	0.96	4.00	4.76

Breaker at Middlepunt for Middlepunt Boynton Open

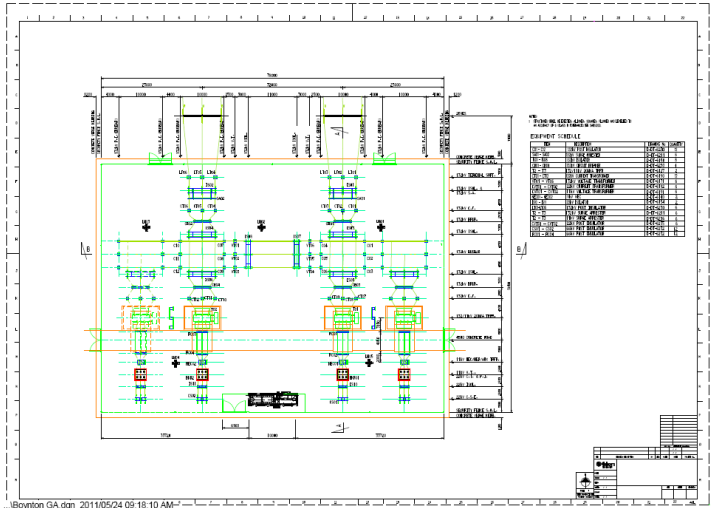
Substation	Voltage (132kV) pu	3 Phase (kA)	1 Phase (kA)
Boynton	0.92	2.82	3.48
Middlepunt	0.97	6.19	6.05
Dithabaneng	0.93	3.05	3.87
Lebowa	0.93	4.00	4.79

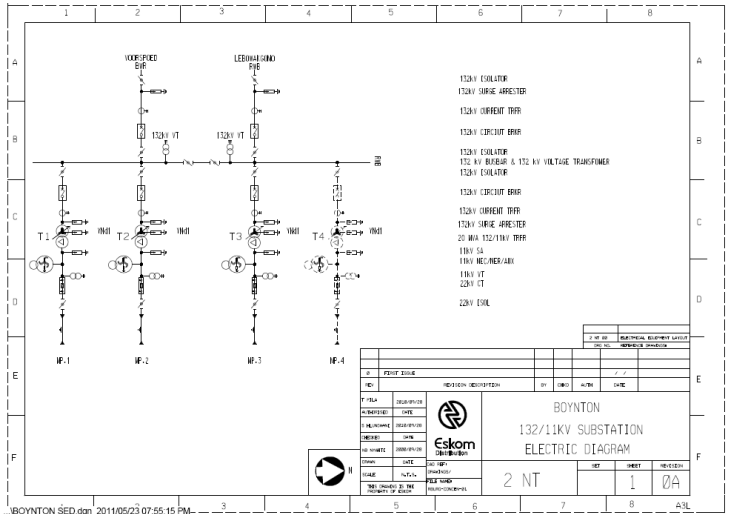
Scope of Work – Boynton Substation and line bays

Discuss the Technical Issues related to:

- Facilities: Relay room will be constructed to house switch gear panels and batteries

Substation: Layout – 4 x 20-40MVA substation will be design with single HV busbar and complete 11kV line bays. Only three transformer will be install





•Site Selection – The existing site is flat. Existing soil will be removed and replace by import soil to final 1; 250 and maximum of 1:100

- Yard fence: Yard fence and perimeter fence will be constructed if substation is out of customer fence.

Scope of Work – Substation and line bays Cont

Discuss the Technical Issues related to:

- Civil & Steel
  - Earth works: Done by customer
  - Foundations: D-DT 5200 series to be used.
  - Earthlings / Earth mat design: Will be designed using 80eei distribution tool.
  - Passive Fire Protection: Fire Wall is required for the 3rd transformer, the distance between transformer 1 & 2 is more than 12m.
  - Drainage: Oil dam, bund wall and oil trap will be constructed.
- Electrical
  - All equipment will be rated to 2500A and kA of 31kA to 40kA vs 2.89kA fault levels
  - Conductor short time rating vs 2.89kA fault levels
  - Structures All steel structure will be as per D-DT 5200
  - Circuit / Conductor Selection (Centipede to Bull and tubes for busbar and cable end support.

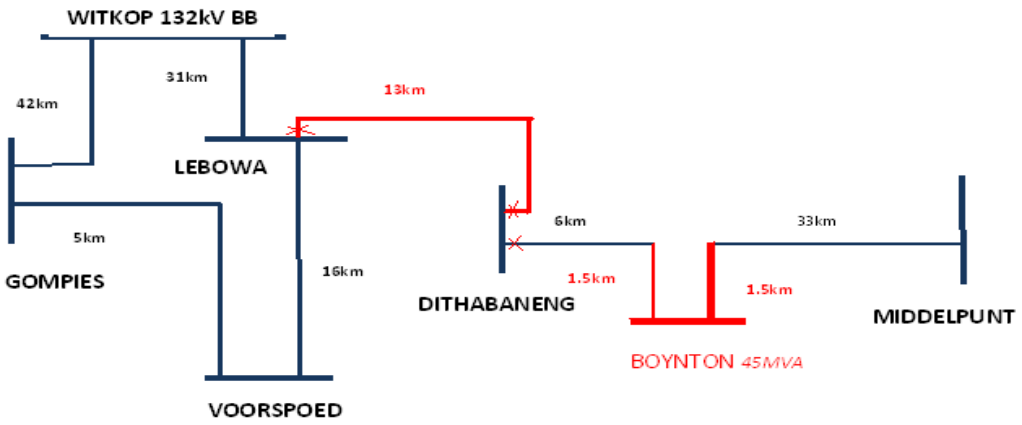
Scope of Work – Detail Design Line

- Civil
  - Mono steel pole foundations (7850 series) will be required for all structures.
  - The concrete cap will be used for the base protection against the rust.
  - Three pole structures will be used when crossing existing HV lines as indicated on line profile.
  - Soil nomination will be required for the selection of foundation type (Geotech).

- Electrical & Mechanical
  - The line will be strung with kingbird conductor.
  - Vibration dampers will be used on each pole.
  - The post insulator will be used for suspension pole and strain pole with a angle of greater than 90 degrees.
  - The earth wire will be connected to all structures and terminate to terminal structure.
  - The terminal structure will be bonded to substation earth mat.
  - Substation faults level from Lebowakgomo - Dithabaneng are as follows:
  - 3.05kA and 4.00kA on three phase and
  - The line will be template at 70 degree.

- Survey
  - Survey will be done for both 3km and 13km lines indicating existing infrastructure crossings.
  - Line profiles optimised for final line design.

Scope of Work – Lines



- Construct 2 x 1.5km to supply Boynton substation from Dithabaneng – Middelpunt 132kV line by creating lilo.
- Contruct 13km line from Lebowakgomo substation to Dithabaneng substation.
- Establish 132kV line at Lebowakgomo and Dithabaneng substation.
- Install complete line bay on Ditabaneng – Middelpunt line bay at Dithabaneng substation.

Scope of Work – Control Plant

Project Overview

Boynton Mphahlele substation will be 3 x 20MVA 132/11kV substation.

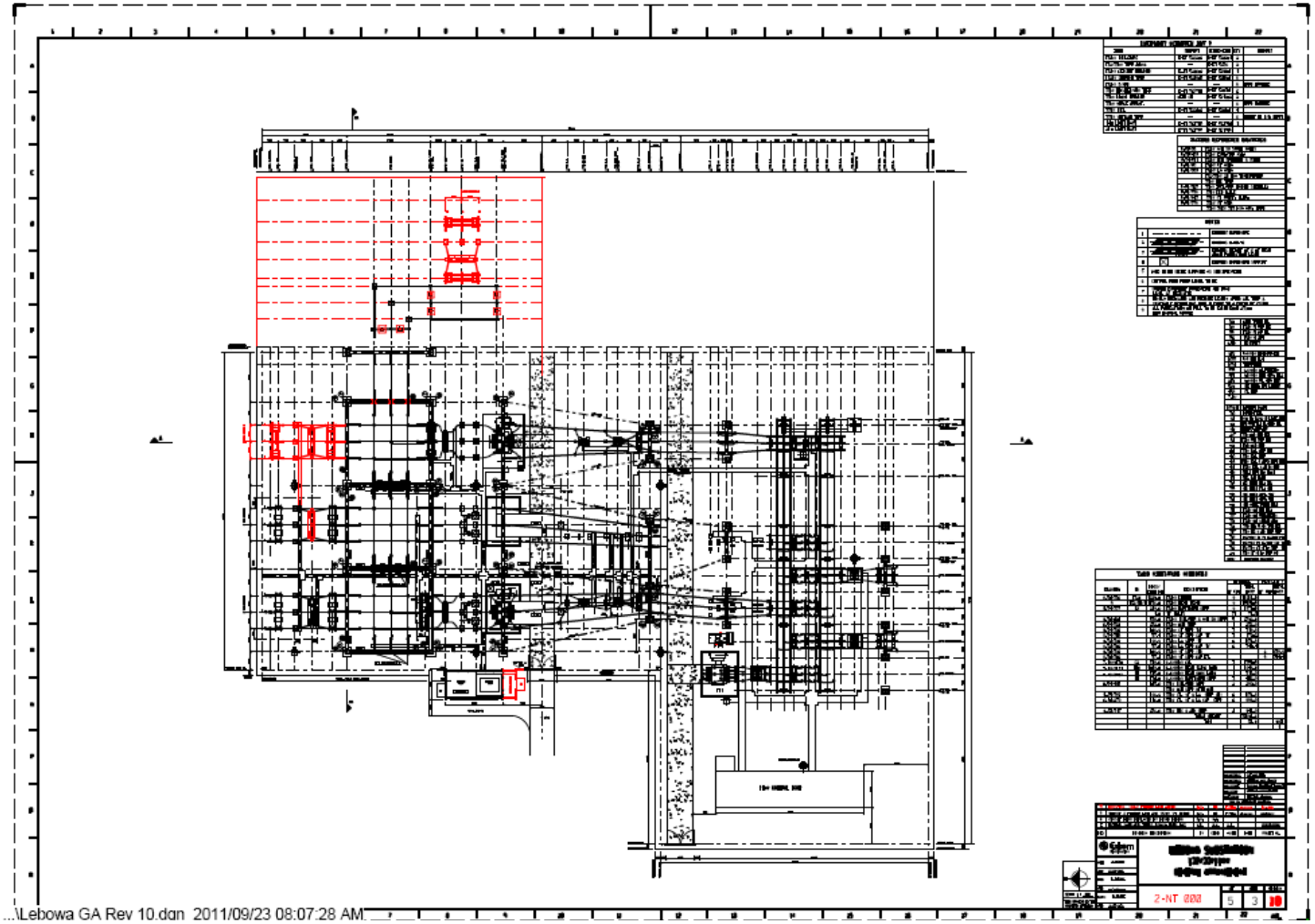
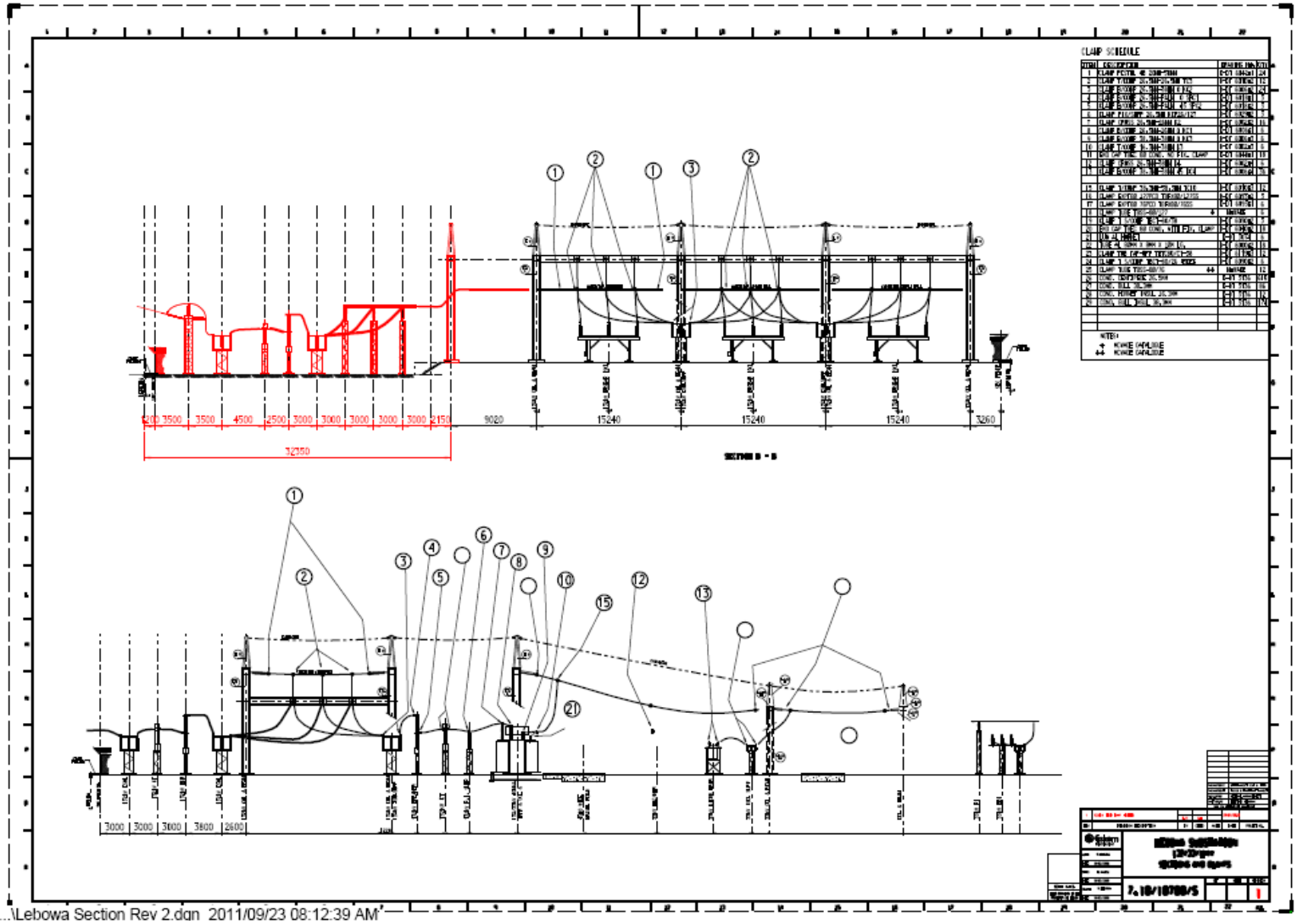
The substation will be supply from Dithabaneng – Middelpunt 132kV line with loop in and out.
The new line will be constructed from Lebowakgomo substation to Dithabaneng for backup supply to Boynton due to breaker down, planned maintenance work on one of line bays at Boynton substation and to alleviate voltage on 132kV side.

Proposed Scope of Work

Install and commission 3 X 3TM5110 and 3 X 4TC5100 new transformer schemes

Install 6 X tariff meters for 3 transformer bays

LEBOWAKGOMO GA WITH BOYNTON LINE BAY



LEBOWAKGOMO SECTION