



VOLUME 4 – Bill of Material
Watershed 132kV Line diversions
Project ID: CTXQ0827

NED
NWOU-AC
Rev 0

INDEX :

DESCRIPTION		PAGE	Attached Y/N
1.	Primary Plant Design Bill of Material		
1.1	Design Bill of Material		Y
2	Primary Plant Ordering Schedules		
2.1	Consolidated Bill of Material		Y
2.2	Non-stock Equipment Ordering Schedule		Y
2.3	Label Ordering Schedule		Y

Comments:

The following document contains the Bill of Material information needed to divert the Kingbird lines from Watershed substation to Sephaku, Klerksdorp North, Makokskraal and Zeerust substations. 16kA OPGW shall be installed on the watershed Sephaku line and Wolf on the other lines.

Please note: Do not order material specified on design bill of materials documents. Material to be ordered is specified on the Order bill of materials document The OPGW is a separate design to be submitted by NED: Control Plant.

Please Note: Contractor to ensure that all material is Eskom approved material according to Eskom's Buyer's Guide

Revision Details: Rev.0

Compiled By

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Watershed 132kV lines diversion

1.1 Structure - 132kV 3-pole intermediate structure

ITEM	DESCRIPTION	DRW. NO	SAP	UNIT	QTY	TOTAL
Poles						
1	132kV 3 pole intermediate structure (18m,20m,18m)	D-DT-7617	Non-stock	set	1	2
2	132kV 3 pole intermediate structure (16m,18m,16m)	D-DT-7617	Non-stock	set	1	

Intermediate Insulator Assembly as per D-DT 7321

1	Insul, Line Post 132kV 5.3kN T/C 31C D7013	D-DT-7013	0180632	ea	3	6
2	Damper,M/F Vibration 20.98-23.90	D-DT-7005	0168893	ea	6	12
3	Armour Rod, HF Cond 23.61/24.79 Al	D-DT 7034	0168763	ea	3	6
4	Clamp, Trunnion L/Post Insul 25.5-38 D7010	D-DT-7010	0165511	ea	3	6

Intermediate Earth Wire Assembly (Non-Insulated) as per D-DT-7331 (for Wolf)

1	Clamp, S/Wire (similar to D-DT-7003,but for Wolf)	McWade	H32413	ea	1	2
2	Armour Rod, Hf Cond, 18.81/19.86 Al	D-DT-7034	0168765	ea	1	2
3	Damper,M/F Vibration 18.13-19.98	D-DT-7005	0168960	ea	2	4

Intermediate Foundation Details as per D-DT-7850

1	Foundation in Type 3 Soil		Non-Stock	set	3	6
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1.2 Structure - 132kV strain monopole self-support

ITEM	DESCRIPTION	DRW. NO	SAP	UNIT	QTY	TOTAL
Poles						
1	132kV 02 deg strain 18m monopole self-support	strsce0218kw110	Non-stock	ea	2	10
2	132kV 45 deg strain 18m monopole self-support	strsce4518kw110	Non-stock	ea	5	
3	132kV 90 deg strain 18m monopole self-support	strsce9018kw110	Non-stock	ea	2	
4	132kV 35 deg strain (16m,18m, 16m) 3pole self-support	str3psce3518kw158	Non-stock	set	1	

Strain Insulator Assembly as per D-DT 7311

1	Shackle, Straight Bolt Type 120kN	D-DT-7017	0163406	ea	6	60
2	Turnbuckle, Eye Tongue 120kN	D-DT-7007	0164300	ea	6	60
3	Clevis-Ball 16mm IEC 80x22 120kN	D-DT-6059	0222125	ea	3	30
4	Insul, L/Rod 132kV 120kN B/S 31C Comp	D-DT-7014	0167607	ea	6	60
5	Socket-Tongue 16mm 120kN	D-DT-6061	0010270	ea	6	60
6	Clamp,C D/End Assy K/Bird 23.88 ACSR	D-DT-7000	0168747	ea	6	60
7	Damper,M/F Vibration 20.98-23.90	D-DT-7005	0168893	ea	6	60
8	BALL-EYE OVAL 16mm 120kN	D-DT-7008	0010258	ea	6	60

Jumper Insulator Assembly as per D-DT 7321

1	Insul, Line Post 132kV 5.3kN D/E 31C	D-DT-7013	0190380	ea	3	30
2	Armour Rod, HF Cond 23.61/24.79 Al	D-DT 7034	0168763	ea	3	30
3	Clamp,Susp Pivoted 25.0-40.0	D-DT-7009	0402629	ea	3	30
4	Shackle,Twisted Bolt Type 120kN	D-DT-7019	0163408	ea	3	30

Non-insulated Earth Wire Assemblies(strain) as per D-DT-7323/2-NT/697

1	Shackle, Straight Bolt Type 120kN	D-DT-7017	0163406	ea	3	30
2	Clamp,C D/End Assy Wolf 18.13 ACSR	D-DT-7000	0402499	ea	2	20
3	Damper,M/F Vibration 18.13-19.98	D-DT-7005	0168960	ea	2	20
4	Turnbuckle, Eye Tongue 120kN	D-DT-7007	164300	ea	1	10

Strain Self Support Foundation Details

1	132kV 02 deg strain 18m monopole self-support	D-WC-7602-07-07-02	Non-Stock	ea	2	20
2	132kV 45 deg strain 18m monopole self-support	D-WC-7602-07-11-03	Non-Stock	ea	5	50
3	132kV 90 deg strain 18m monopole self-support	D-WC-7602-07-11-03	Non-Stock	ea	1	10
4	132kV 35 deg strain 18m 3 pole self-support	D-WC-7602-07-07-02	Non-Stock	set	1	10

1.3 Structure - 132kV 3 pole stayed structure

ITEM	DESCRIPTION	DRW. NO	SAP	UNIT	QTY	TOTAL
1	132kV 3 pole stayed strain (16m,18m,16m)	D-DT-7618	Non-Stock	set	2	3
2	132kV 3 pole stayed strain (20m,22m,20m)	D-DT-7618	Non-Stock	set	1	

Strain Insulator Assembly as per D-DT 7311

1	Shackle, Straight Bolt Type 120kN	D-DT-7017	0163406	ea	6	18
2	Turnbuckle, Eye Tongue 120kN	D-DT-7007	0164300	ea	3	9
3	Clevis-Ball 16mm IEC 80x22 120kN	D-DT-6059	0222125	ea	6	18
4	Insul, L/Rod 132kV 120kN B/S 31C Comp	D-DT-7014	0167607	ea	6	18
5	Socket-Tongue 16mm 120kN	D-DT-6061	0010270	ea	6	18
6	Clamp,C D/End Assy K/Bird 23.88 ACSR	D-DT-7000	0168747	ea	6	18
7	Damper,M/F Vibration 20.98-23.90	D-DT-7005	0168893	ea	6	18
8	Ball-Eye Oval 16mm 120kN	D-DT-7008	0010258	ea	6	18

Please Note: A typical structure will have 6 vibration dampers per span, but the number of dampers depends on span lengths of specific project line design

Jumper Insulator Assembly as per D-DT 7321

1	Insul, Line Post 132kV 5.3kN D/E 31C	D-DT-7013	0190380	ea	3	9
2	Armour Rod, HF Cond 23.61/24.79 Al	D-DT 7034	0168763	ea	3	9
3	Clamp,Susp Pivoted 25.0-40.0	D-DT-7009	0402629	ea	3	9
4	Shackle,Twisted Bolt Type 120kN	D-DT-7019	0163408	ea	3	9

Non-insulated Earth Wire Assemblies(strain) as per D-DT-7323/2-NT/697

1	Shackle, Straight Bolt Type 120kN	D-DT-7017	0163406	ea	3	9
2	Clamp,C D/End Assy Wolf 18.13 ACSR	D-DT-7000	0402499	ea	2	6
3	Damper,M/F Vibration 18.13-19.98	D-DT-7005	0168960	ea	2	6
4	Turnbuckle, Eye Tongue 120kN	D-DT-7007	0164300	ea	1	3

Please Note: A typical structure will have 2 vibration dampers per span, but the number of dampers depends on span lengths of specific project line design

Adjustable M24 Stay Assembly (115kN) as per D-DT 7325

1	Shackle, Straight Bolt Type 120kN	D-DT-7017	0163406	ea	7	21
2	Thimble,St To Fit 14mm Dia. Wire	D-DT 3026	163399	ea	7	21
3	Guygrip D/E St To Fit 19/2.65 Steel Wire	D-DT 7035	402537	ea	14	42
4	Wire Strand,St 3X4.00 1100MPa	D-DT-7036	0185944	m	180	540
5	Stayrod 133kN 2400X24 Adjust	D-DT 7023	0163384	ea	17	51
6	Stay Plate 600X600X6	D-DT-3172	163420	ea	7	21

Strain Foundation Details as per D-DT-7851 Rev.1

1	Foundation in Type 2 Soils	D-DT-7851	Non-Stock	set	3	9
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1.4 Miscellaneous Items						
ITEM	DESCRIPTION	DRW. NO	SAP	UNIT	QTY	TOTAL
1	Cond,Acsr Kingbird 23.90D Ungrs	D-DT-3136	0400662	phm	6900	6900
2	Joint,M/Span Comp Kingbird 23.87	D-DT-7001	0165770	ea	3	3
3	Joint, M/Span Comp Wolf 18.13	D-DT-7001	0401816	ea	1	1
4	Cond, Acsr Wolf 18.13D Ungrs	D-DT-3136	0403037	m	2300	2300
5	Insul, Shield Wire C+T 120kN	D-DT-7012	0167605	ea	1	2
1.5 Test Joints						
ITEM	DESCRIPTION	DRW. NO	SAP	UNIT	QTY	TOTAL
1	Cond,Acsr Kingbird 23.90D Ungrs	D-DT-3136	0400662	m	10	20
2	Joint,M/Span Comp Kingbird 23.87	D-DT-7001	0165770	ea	1	2
3	Cond, Acsr Wolf 18.13D Ungrs	D-DT-3136	0403037	m	10	20
4	Joint, M/Span Comp Wolf 18.13	D-DT-7001	0401816	ea	1	2
5	Shackle, Straight Bolt Type 120kN	D-DT-7017	0163406	ea	1	2
6	Clamp,C D/End Assy K/Bird 23.88 ACSR	D-DT-7000	0168747	ea	2	4
7	Clamp, Comp D/End Assy Wolf 18.13	D-DT-7000	0402499	ea	2	4
1.6 Material for 3 Point Star Earth Electrode as per 2-WT/763 (Structure Footing resistance results to be submitted to the Project Engineer/COW before earthing is done)						
ITEM	DESCRIPTION	DRW. NO	SAP	UNIT	QTY	TOTAL
1	Cond, Cu Bare Str 7/1.63 Annealed 16mm SQ	D-DT-3139	0171336	m	40	600
2	Line Tap, TFR Brass/Tinned M12	D-DT-3048	0165566	ea	1	15
3	Lug, Crimp Cu 50 SQ x M14 fixing Hole (as per D-DT-3102 but with M14 fixing hole)	McWade	Non Stock	ea	1	15
4	Clamp, Earth Rod 16 RODPH/BRNZ	D-DT-3093	0165559	ea	4	60
5	Earth Rod Cu 1500x16D Threadless	D-DT-3091	0168669	ea	4	60
6	Set Screw, Hx Galv M12x40 Nut+Wash	D-DT-3082	0163642	ea	1	15
The amount of the annealed copper conductor to be used for earthing will depend on the resistivity test at each pole: $0 \leq \rho \leq 300$, Cu = 20m. $300 \leq \rho \leq 600$, Cu = 40m. $600 \leq \rho \leq 900$, cu = 60m, $900 \leq \rho \leq 1500$, Cu = 80m						
Rev.0						

2.1 Structures Ordering Bill of Materials

ITEM	DESCRIPTION	DRW. NO	SAP	UNIT	QTY
1	132kV 3 pole intermediate structure (18m,20m,18m)	D-DT-7617	Non-stock	set	1
2	132kV 3 pole intermediate structure (16m,18m,16m)	D-DT-7617	Non-stock	set	1
3	132kV 02 deg strain 18m monopole self-support	strsce0218kw110	Non-stock	ea	2
4	132kV 45 deg strain 18m monopole self-support	strsce4518kw110	Non-stock	ea	5
5	132kV 90 deg strain 18m monopole self-support	strsce9018kw110	Non-stock	ea	2
6	132kV 35 deg strain (16m,18m, 16m) 3pole self-support	str3psce3518kw158	Non-stock	ea	1
7	132kV 3 pole stayed strain (16m,18m,16m)	D-DT-7618	Non-stock	set	2
8	132kV 3 pole stayed strain (20m,22m,20m)	D-DT-7618	Non-stock	set	1

2.2 Miscellaneous Equipment Ordering Bill of Materials

ITEM	DESCRIPTION	DRW. NO	SAP	UNIT	QTY
1	Armour Rod, Hf Cond, 18.81/19.86 Al	D-DT-7034	0168765	ea	2
2	Armour Rod, HF Cond 23.61/24.79 Al	D-DT 7034	0168763	ea	45
3	Insul, L/Rod 132kV 120kN B/S 31C Comp	D-DT-7014	0167607	ea	90
4	BALL-EYE OVAL 16mm 120kN	D-DT-7008	0010258	ea	78
5	Clamp,C D/End Assy Wolf 18.13 ACSR	D-DT-7000	0402499	ea	30
6	Damper,M/F Vibration 20.98-23.90	D-DT-7005	0168893	ea	90
7	Clamp, S/Wire (similar to D-DT-7003,but for Wolf)	McWade	H32413	ea	2
8	Socket-Tongue 16mm 120kN	D-DT-6061	0010270	ea	78
9	Cond,Acsr Kingbird 23.90D Ungrs	D-DT-3136	0400662	phm	6 920
10	Cond, Acsr Wolf 18.13D Ungrs	D-DT-3136	0403037	m	2 320
11	Cond, Cu Bare Str 7/1.63 Annealed 16mm SQ	D-DT-3139	0171336	m	600
12	Insul, Line Post 132kV 5.3kN T/C 31C D7013	D-DT-7013	0180632	ea	45
13	Damper,M/F Vibration 18.13-19.98	D-DT-7005	0168960	ea	30
14	Clamp, Trunnion L/Post Insul 25.5-38 D7010	D-DT-7010	0165511	ea	6
16	Clamp, Earth Rod 16 RODPH/BRNZ	D-DT-3093	0165559	ea	60
17	Earth Rod Cu 1500x16D Threadless	D-DT-3091	0168669	ea	60
18	Set Screw, Hx Galv M12x40 Nut+Wash	D-DT-3082	0163642	ea	22
19	Insul, Shield Wire C+T 120kN	D-DT-7012	0167605	ea	2
20	Thimble,St To Fit 14mm Dia. Wire	D-DT 3026	163399	ea	21
21	Guygrip D/E St To Fit 19/2.65 Steel Wire	D-DT 7035	402537	ea	42
22	Wire Strand,St 3X4.00 1100MPa	D-DT-7036	0185944	m	540
23	Stayrod 133kN 2400X24 Adjust	D-DT 7023	0163384	ea	51
24	Stay Plate 600X600X6	D-DT-3172	163420	ea	21
25	Joint,M/Span Comp Kingbird 23.87	D-DT-7001	0165770	ea	5
26	Joint, M/Span Comp Wolf 18.13	D-DT-7001	0401816	ea	3
27	Line Tap, TFR Brass/Tinned M12	D-DT-3048	0165566	ea	15
29	Turnbuckle, Eye Tongue 120kN	D-DT-7007	0164300	ea	82
30	Shackle, Straight Bolt Type 120kN	D-DT-7017	0163406	ea	140
31	Clamp,Susp Pivoted 25.0-40.0	D-DT-7009	0402629	ea	39
32	Clamp,C D/End Assy K/Bird 23.88 ACSR	D-DT-7000	0168747	ea	82
33	Lug, Crimp Cu 50 SQ x M14 fixing Hole (as per D-DT-3102 but with M14 fixing hole)	McWade	Non Stock 26	ea	15
34	Shackle,Twisted Bolt Type 120kN	D-DT-7019	0163408	ea	39
35	Clevis-Ball 16mm IEC 80x22 120kN	D-DT-6059	0222125	ea	48

2.3 Labels Ordering Bill of Materials

All labels shall be manufactured in strict accordance with the following Eskom standards, specifications and drawings :

- SCSSCAAP5 LATEST REVISION
- D-DT-5050 LATEST REVISION

ITEM	DESCRIPTION	DRW. NO	SAP	UNIT	QTY
1	Tower Identification Label	D-DT-5050s1	1 below	ea	15
2	Line Crossing Label	D-DT-5050s2	2 below	ea	0
3	PLATE, PH MKR blu w/blk B	D-DT-6114	0172375	ea	4
4	PLATE, PH MKR red w/blk R	D-DT-6114	0172376	ea	4
5	PLATE, PH MKR wht w/blk W	D-DT-6114	0172377	ea	4

Rev. 0

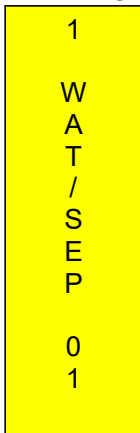
2.3.1 Tower Identification Labels (D-DT-5050 s1)

Notes:

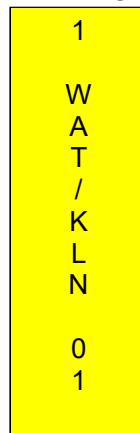
- Approved Viterous Enamel Labels shall be used
- The labels are to be positioned on alternating faces of the structures so that every second label will be visible when viewed from any in-line direction.
- The label shall be installed not less than 5m above ground, measured from the bottom of the label to ground level.

Total of 14 labels

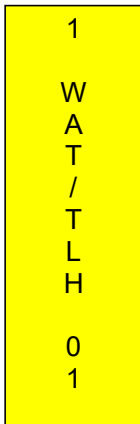
WATERSHED-SEPHAKU



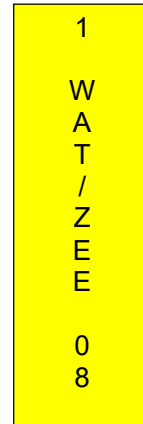
WATERSHED-KLERKSDORP NORTH



WATERSHED-TLHABOLOGANG



WATERSHED-ZEERUST

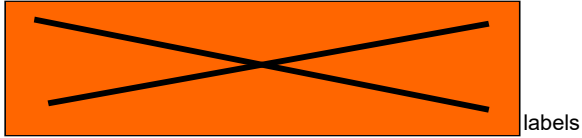


2.3.2 Line Crossing Labels (D-DT-5050 s2)

Notes:

- a) Approved Viterous Enamel Labels shall be used
- b) Line crossing labels shall be installed on three structures on either side of the crossing, facing away from the crossing.
- c) Line crossing labels shall be installed on three structures on either side of a bend larger than 60°, facing away from the bend.

N/A



2.3.3 Phase Disk Labels (D-DT-5047 s3)

Notes:

- a) Approved Viterous Enamel Labels shall be used
- b) Each terminal tower shall be fitted with phase disk labels

Total of 12 labels:

4xR, 4xB & 4xW to be fitted on Watershed Substation Terminal Structures

