

**DETAIL 1:**  
ISOMETRIC ILLUSTRATION OF TYPICAL TYPE 1 TRENCH  
SCALE: N.T.S.

**ABBREVIATIONS:**  
NMS = NEW MAIN INTAKE SUBSTATION  
MV = MEDIUM VOLTAGE SUPPLY  
ICEW = INSULATED COPPER EARTH WIRE  
FO = FIBRE OPTIC CABLE  
SM = SINGLE MODE  
3C = 3 CORE  
48C = 48 CORE  
CCR = CENTRAL CONTROL ROOM  
EW = ELECTRONIC WORKSHOP  
HRSB = HAUL ROAD SECURITY BUILDING  
T1 = TIPPLER 1  
T2 = TIPPLER 2  
T3 = TIPPLER 3

**NOTES:**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE REC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- ANY NEW INFRASTRUCTURE AS SHOWN ON THIS DRAWING MAY CHANGE DURING THE CONSTRUCTION PHASE.
- ALL NEW CABLE ROUTES SHALL BE FINALISED ON SITE, IN CONJUNCTION WITH THE EMPLOYER.
- THE CONTRACTOR SHALL WORK IN CLOSE CO-ORDINATION WITH ALL OTHER APPLICABLE CONTRACTORS TO AVOID OR MINIMIZE ANY CROSSINGS/COLLISIONS AS FAR AS PRACTICALLY POSSIBLE.
- FINAL CABLE ENTRIES/EXITS AT AND IN SUBSTATIONS TO BE CONFIRMED ON SITE WITH EMPLOYER.
- REFER TO CIVIL DRAWINGS FOR SLEEVE/MANHOLE DETAILS.
- ALL BEDDING AND PADDING MATERIAL TO HAVE A FINAL DRY SOIL MEASURED THERMAL RESISTIVITY OF 0.7 K.m/W.
- MV CABLES SIZES TO BE IN ACCORDANCE WITH THOSE SPECIFIED ON THE MV BLOCK AND SINGLE LINE DIAGRAMS.
- REFER TO TECHNICAL SPECIFICATIONS REGARDING PROCEDURES TO BE UNDERTAKEN TO CONFIRM THE BEDDING AND PADDING MATERIAL REQUIRED SOIL THERMAL RESISTIVITY RATING, PRIOR TO INSTALLATION.

**AECOM**  
CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1966/006628/07

**CONTRACTOR / CONSULTANT**

TITLE	NAME	SIGN	DATE
ISSUED FOR CONSTRUCTION	DO	CP	CP
ISSUED FOR CONSTRUCTION	DO	CP	CP

**OPERATING DIVISIONS**

TITLE	NAME	SIGN	DATE
PRE-ENG. / PR. TECH. / PR. ARCH			

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION	DO	CP	CP	2018-04-18
02	ISSUED FOR CONSTRUCTION	DO	CP	CP	2018-03-19

**TRANSNET CAPITAL PROJECTS**

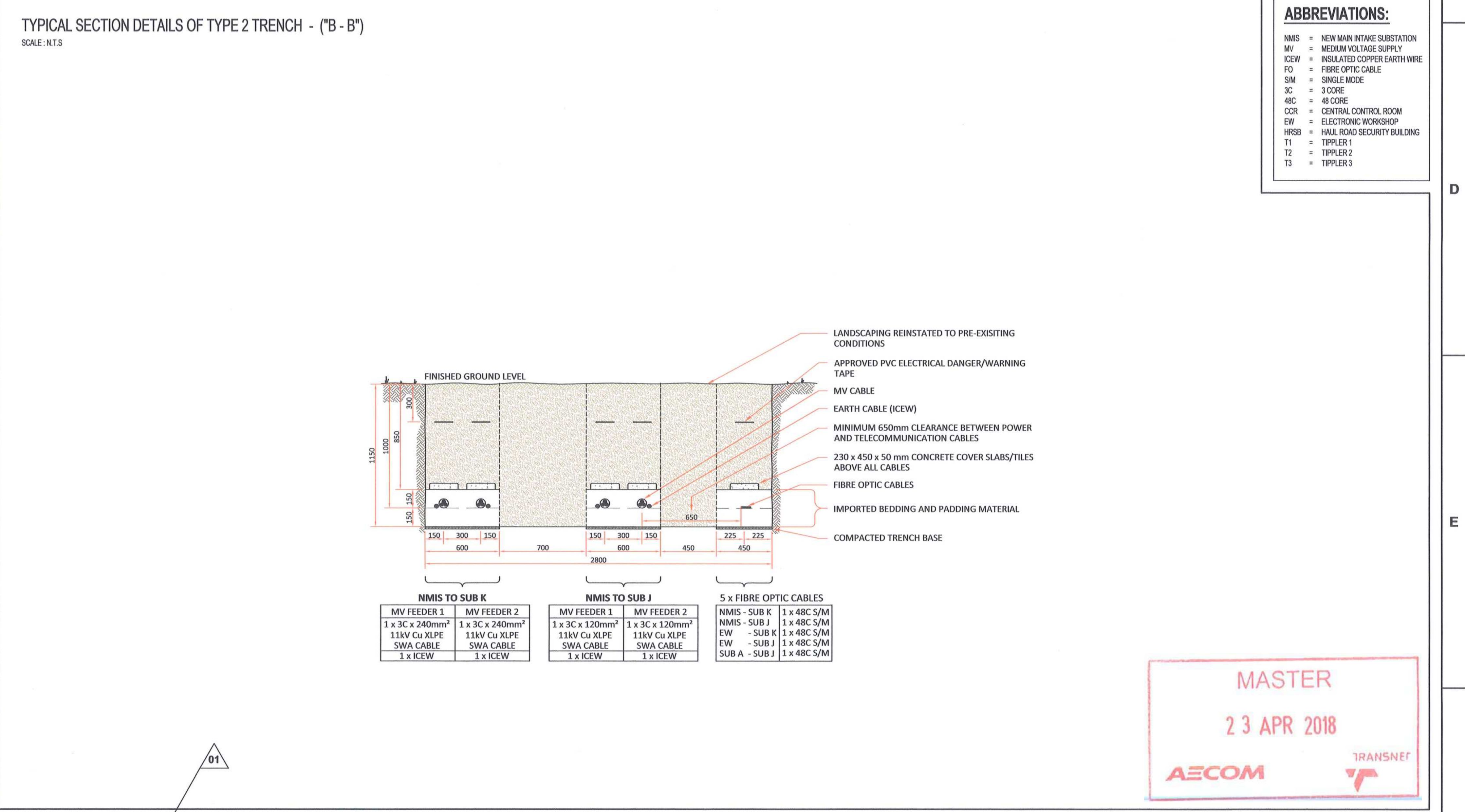
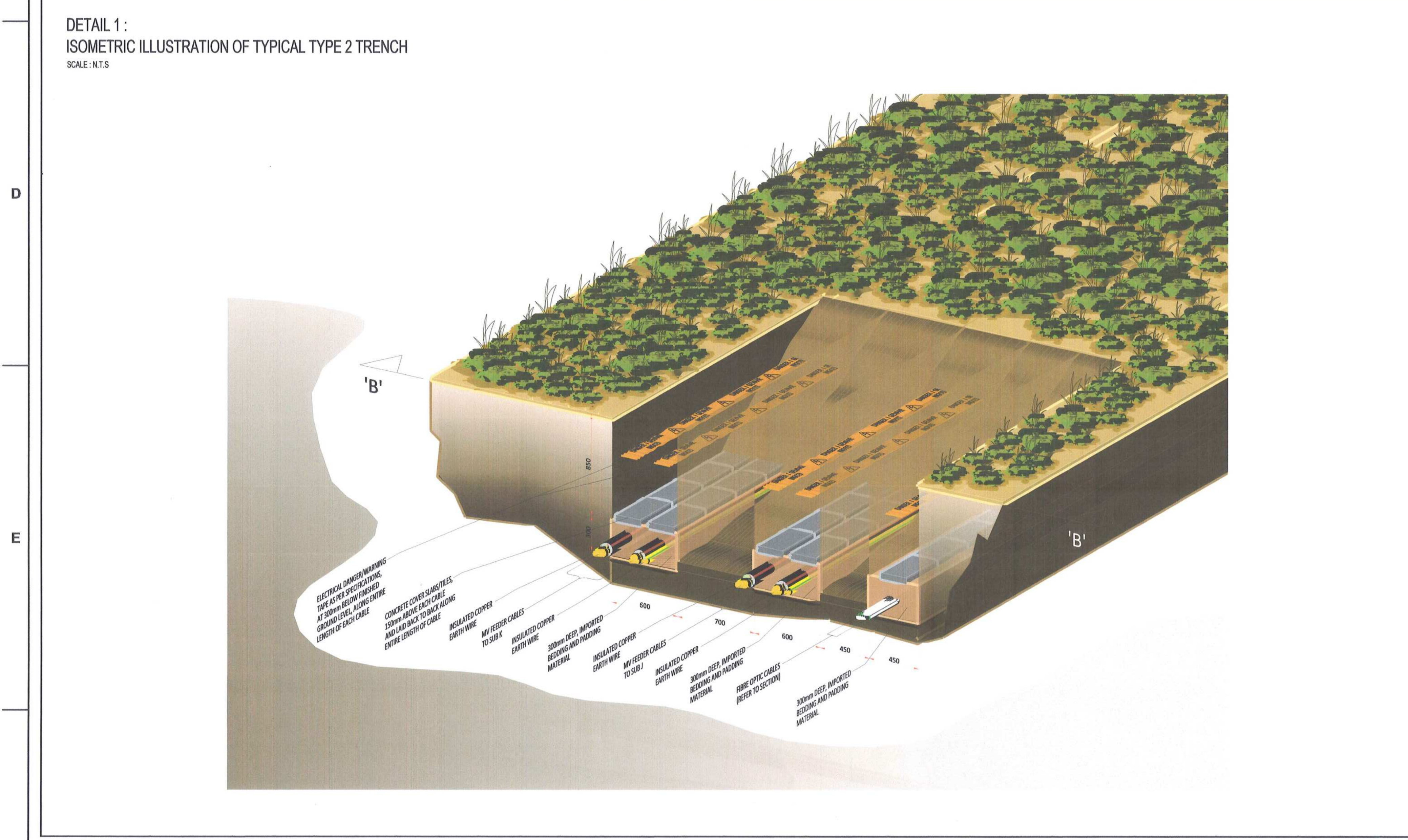
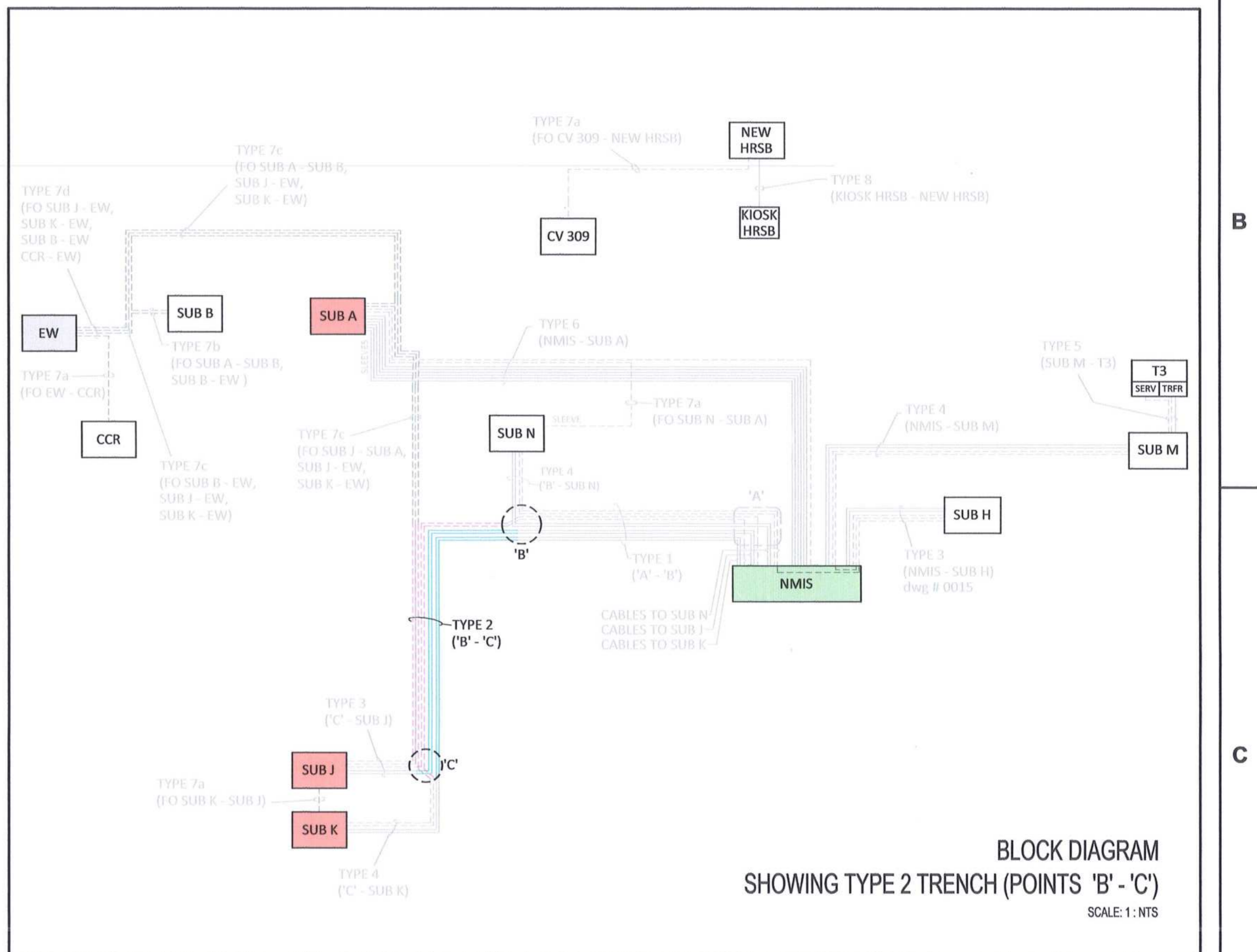
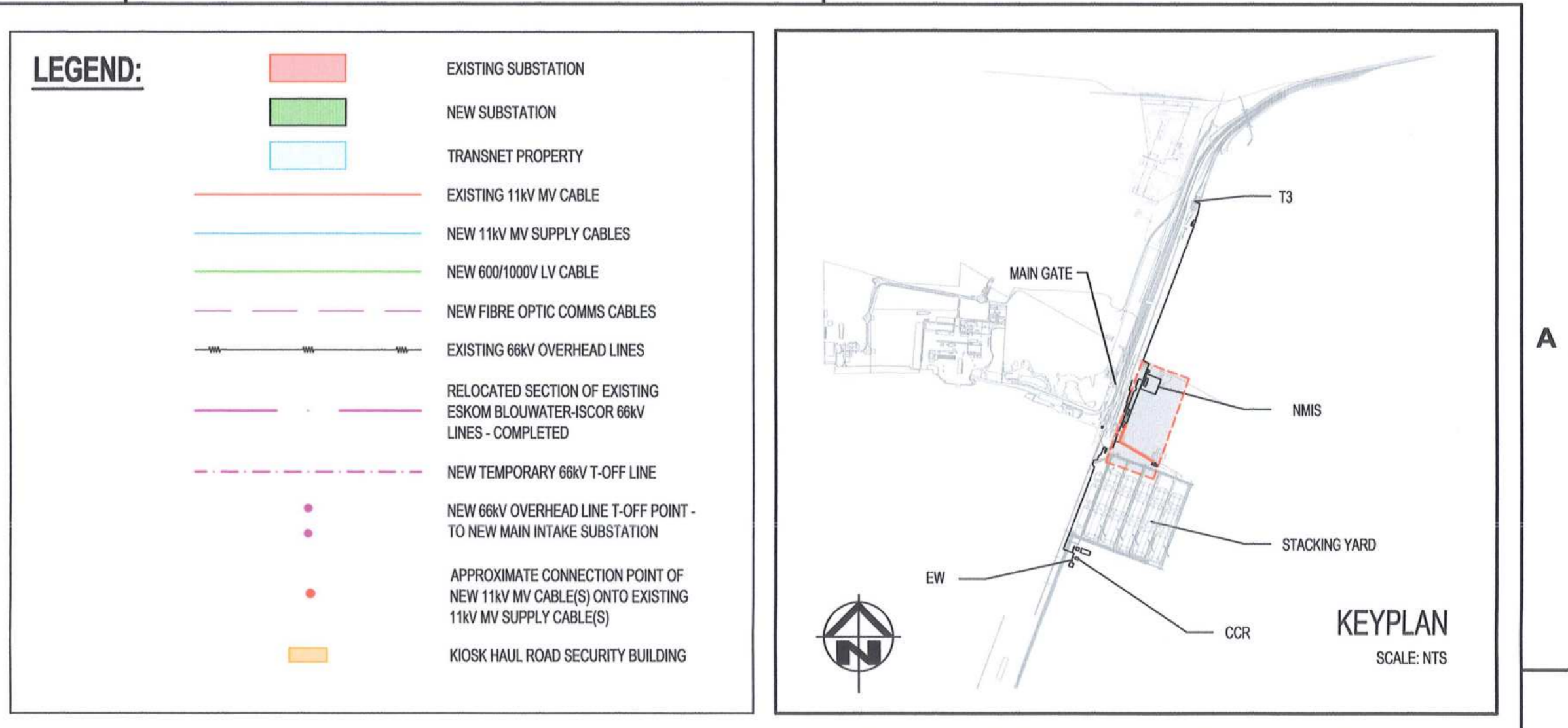
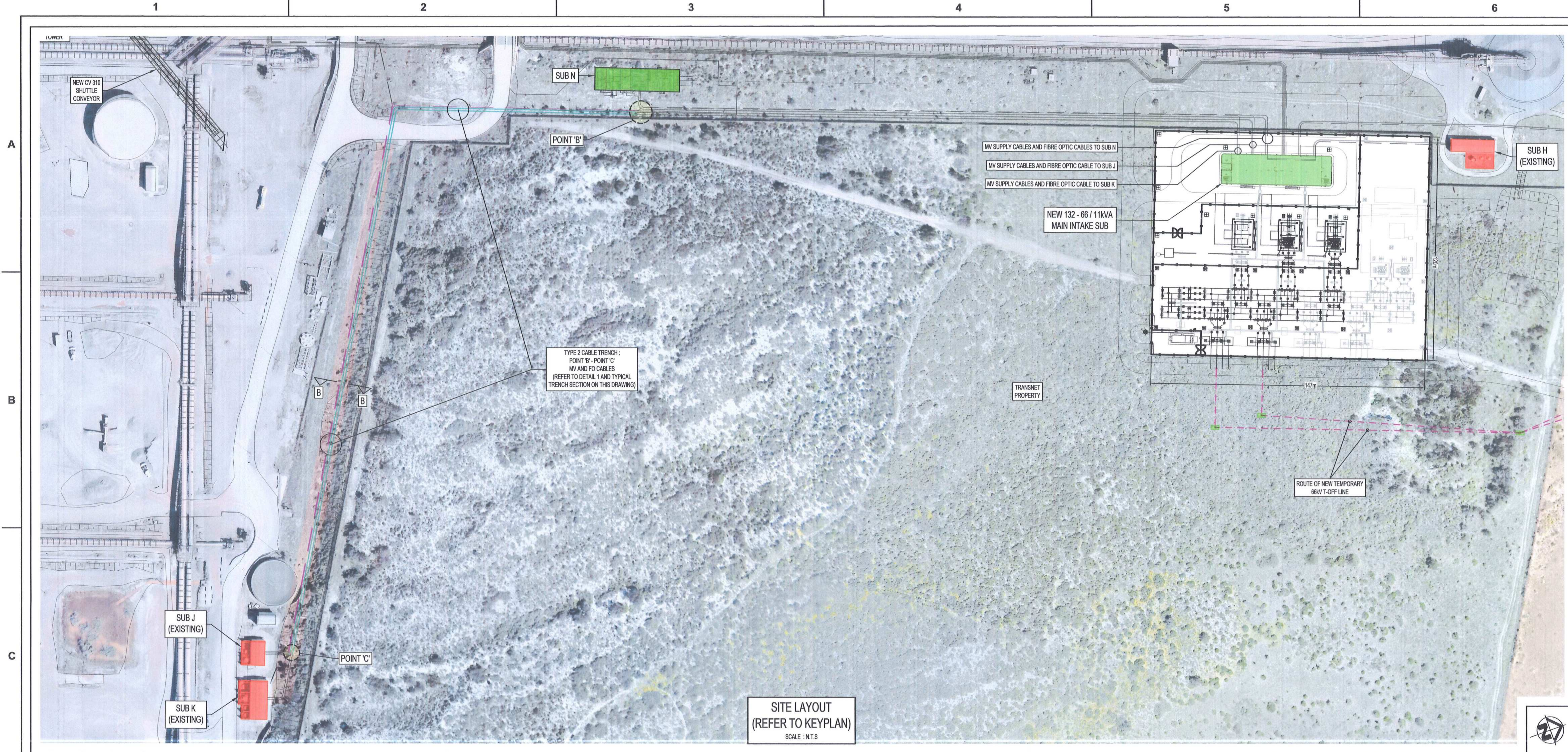
TITLE	NAME	SIGN	DATE
DRAWN	DO		18 04 18
CHECKED	DC		18 04 18
DESIGNED	RS		18 04 18
CHECKED	CP		18 04 18

**Transnet Capital Projects**  
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) REG. NO. 1999/000000  
THIRLEDAVE BUILDING, TYGERBERG PARK,  
150 LYO ROAD DRIVE, PLATTEKLIP  
TEL: 021 940 1999  
FAX: 021 940 2465

**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE:  
CABLE ROUTE TRENCH DETAILS  
TYPE 1**

PROJECT NUMBER: 001 FIB DNS TYPE DRAWING NO: SHEET REV ID  
1 9 2 4 7 0 1 2 3 0 0 E D E 0 0 1 2 0 1 0 1 AE



**DETAIL 1:**  
ISOMETRIC ILLUSTRATION OF TYPICAL TYPE 2 TRENCH  
SCALE: N.T.S.

**NOTES:**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- ANY NEW INFRASTRUCTURE AS SHOWN ON THIS DRAWING MAY CHANGE DURING THE CONSTRUCTION PHASE.
- ALL NEW CABLE ROUTES SHALL BE FINALISED ON SITE, IN CONJUNCTION WITH THE EMPLOYER.
- THE CONTRACTOR SHALL WORK IN CLOSE CO-ORDINATION WITH ALL OTHER APPLICABLE CONTRACTORS TO AVOID OR MINIMIZE ANY CROSSINGS/CLASHES AS FAR AS PRACTICALLY POSSIBLE.
- FINAL CABLE ENTRIES/EXITS AT AND IN SUBSTATIONS TO BE CONFIRMED ON SITE WITH EMPLOYER.
- REFER TO CIVIL DRAWINGS FOR SLEEVE/MANHOLE DETAILS.
- ALL BEDDING AND PADDING MATERIAL TO HAVE A FINAL DRY SOIL MEASURED THERMAL RESISTIVITY OF 0.7 K.m/W.
- MV CABLES SIZES TO BE IN ACCORDANCE WITH THOSE SPECIFIED ON THE MV BLOCK AND SINGLE LINE DIAGRAMS.
- REFER TO TECHNICAL SPECIFICATIONS REGARDING PROCEDURES TO BE UNDERTAKEN TO CONFIRM THE BEDDING AND PADDING MATERIAL REQUIRED SOIL THERMAL RESISTIVITY RATING, PRIOR TO INSTALLATION.

**ABBREVIATIONS:**

- NMIS = NEW MAIN INTAKE SUBSTATION
- MV = MEDIUM VOLTAGE SUPPLY
- ICEW = INSULATED COPPER EARTH WIRE
- FO = FIBRE OPTIC CABLE
- SM = SINGLE MODE
- 3C = 3 CORE
- 4C = 40 CORE
- CCR = CENTRAL CONTROL ROOM
- EW = ELECTRONIC WORKSHOP
- HRSB = HULL ROAD SECURITY BUILDING
- T1 = TIPPLER 1
- T2 = TIPPLER 2
- T3 = TIPPLER 3

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION. 'HOLD' CLOUD NOTE ADDED.	DD	CP	CP	2018-04-18
02	ISSUED FOR CONSTRUCTION	DD	CP	CP	2018-03-19

**CONTRACTOR / CONSULTANT**

TITLE	NAME	SIGN	DATE
DESIGNED	DD		18/04/18
CHECKED	DD		18/04/18
DESIGNED	BS		18/04/18
CHECKED	CP		18/04/18

**OPERATING DIVISIONS**

TITLE	NAME	SIGN	DATE
PR.ENG. / PR.TECH./PR. ARCH			
SIGNATURE			18/04/18
REG. NUMBER	21220126		
SCALE:	N.T.S.		

**TRANSNET CAPITAL PROJECTS**

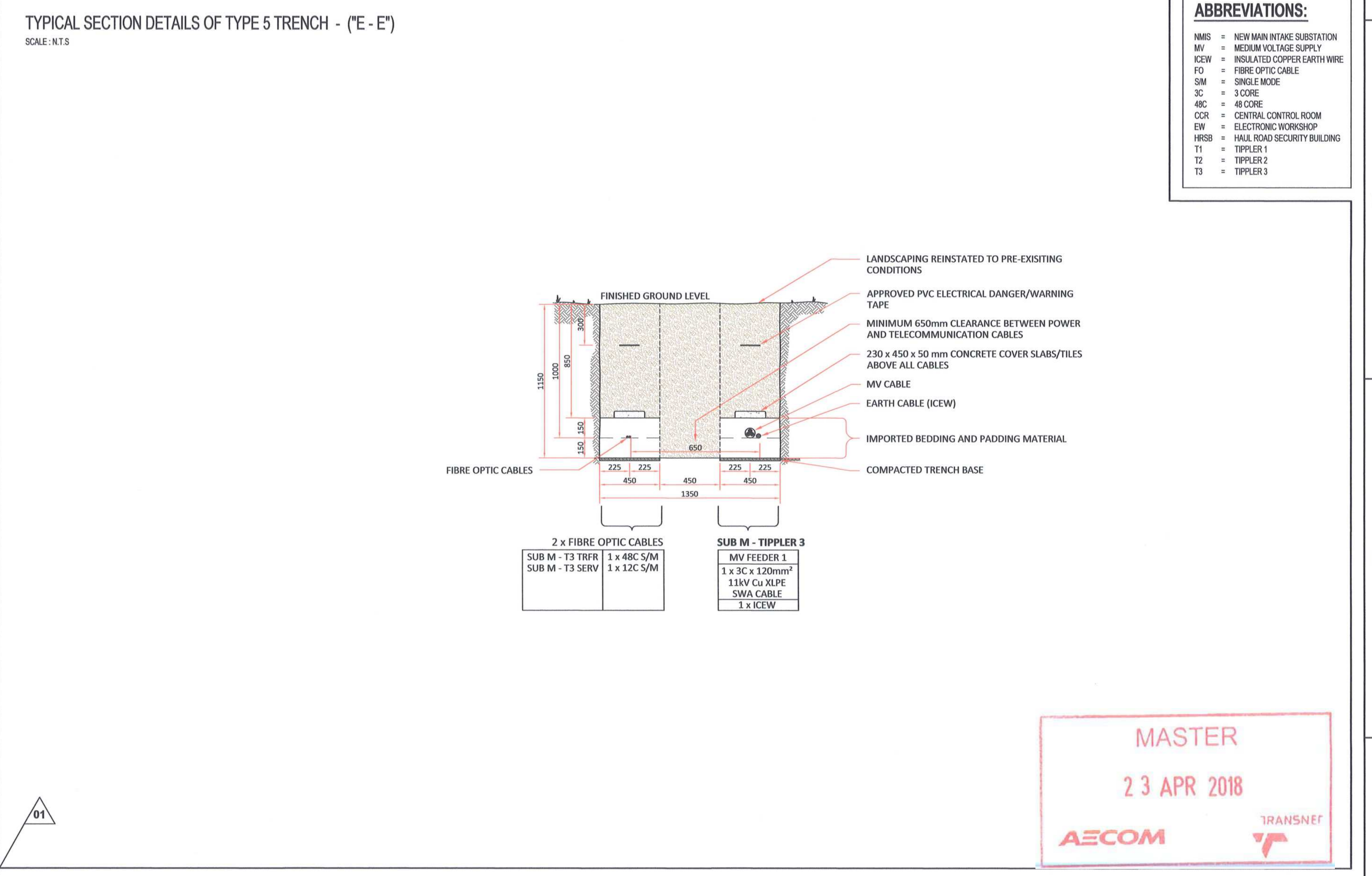
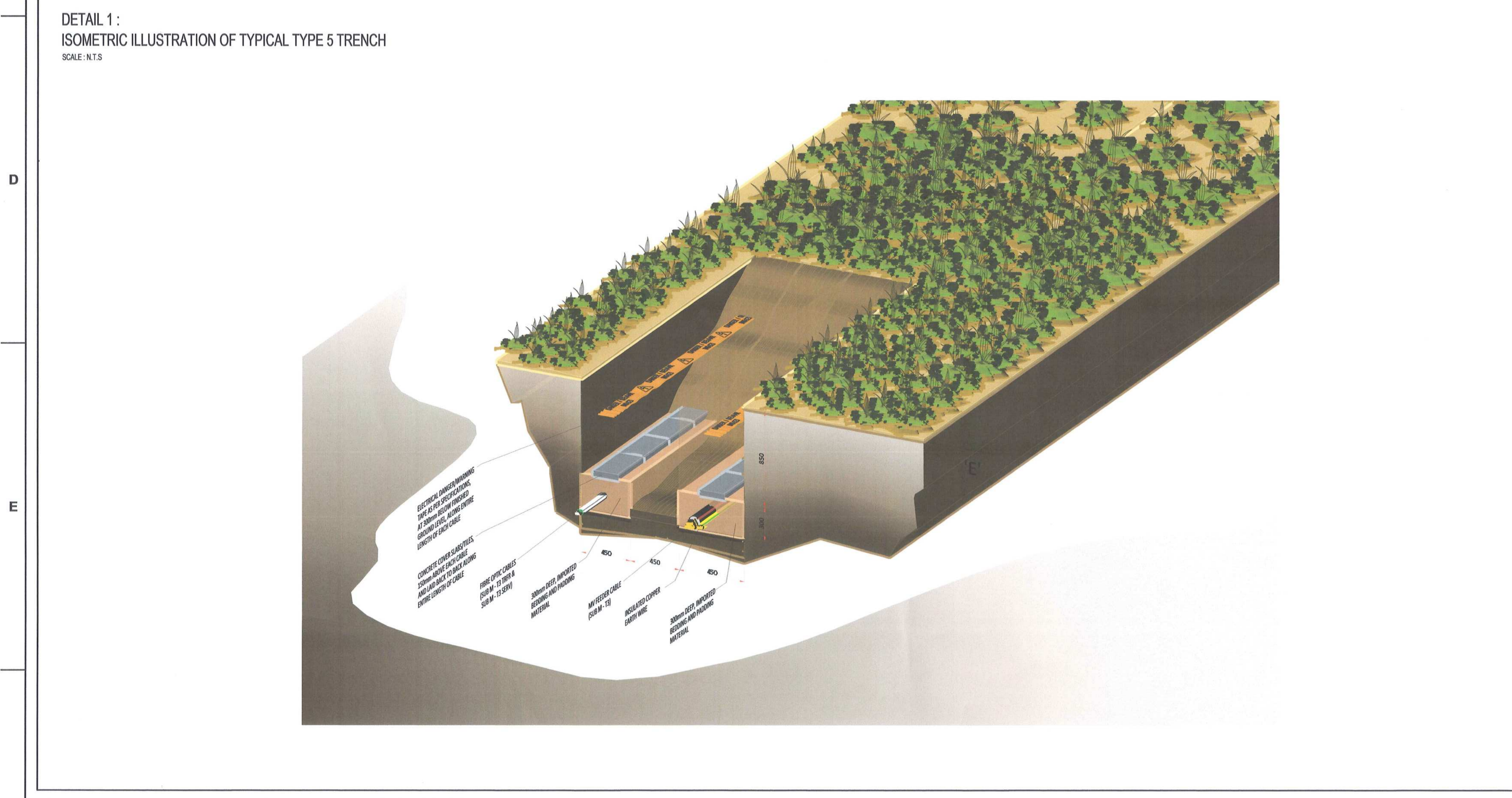
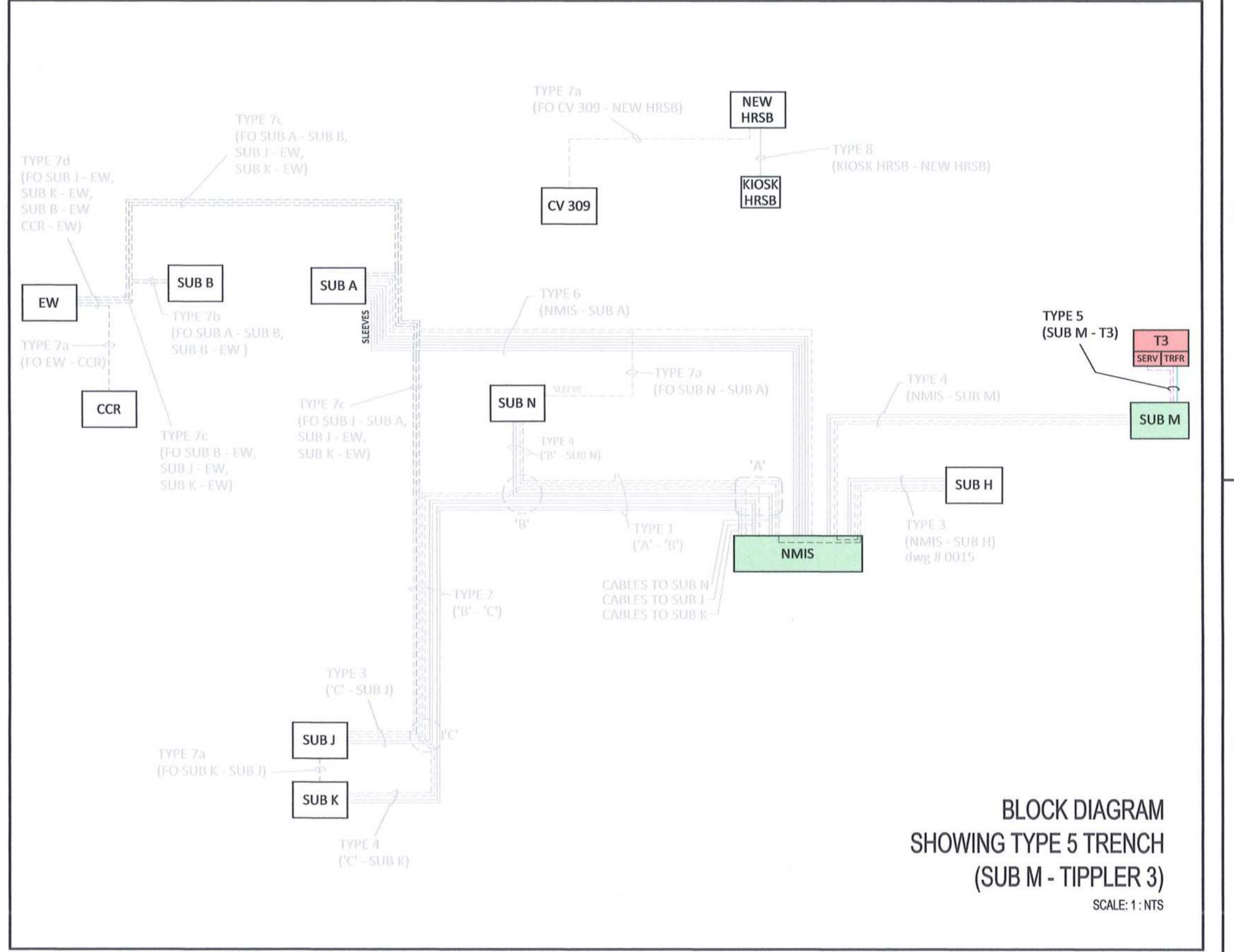
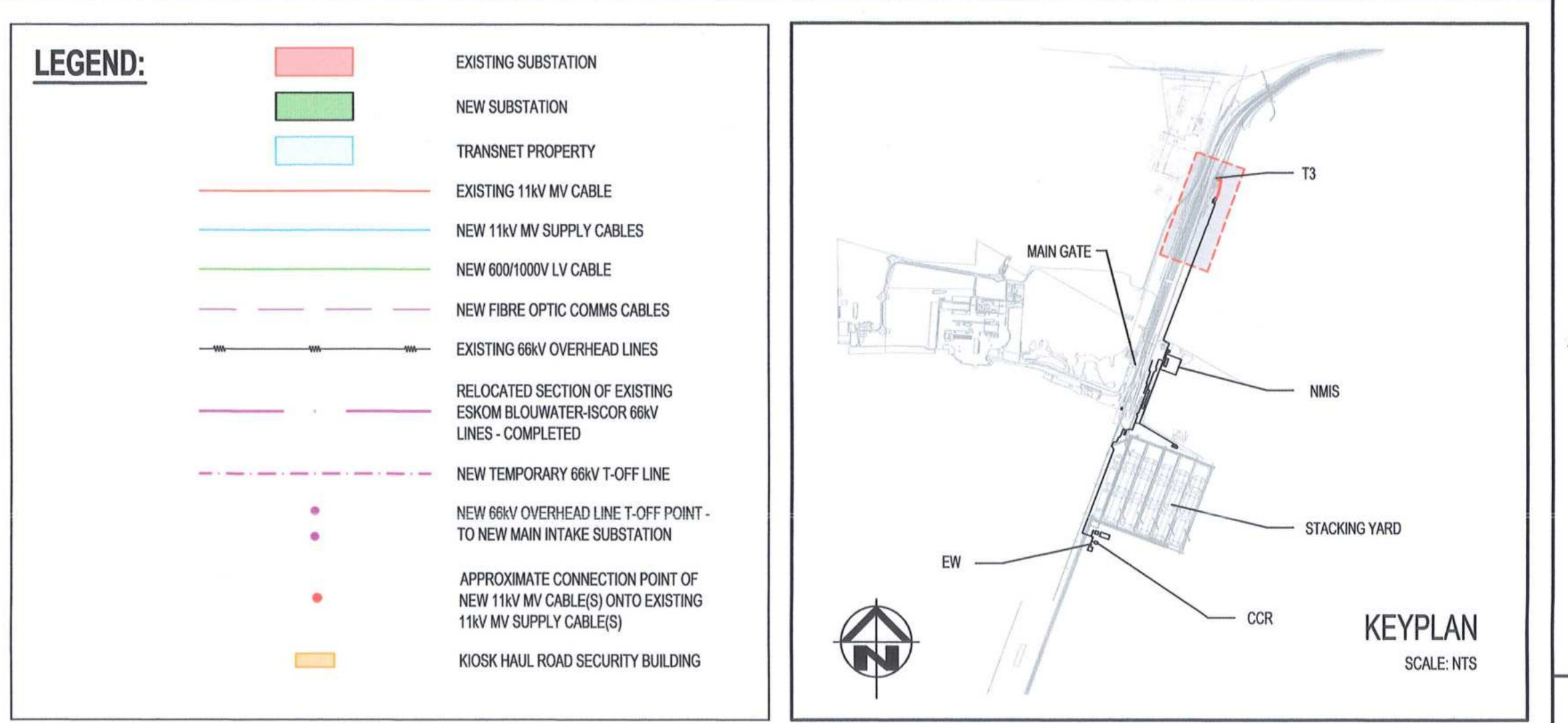
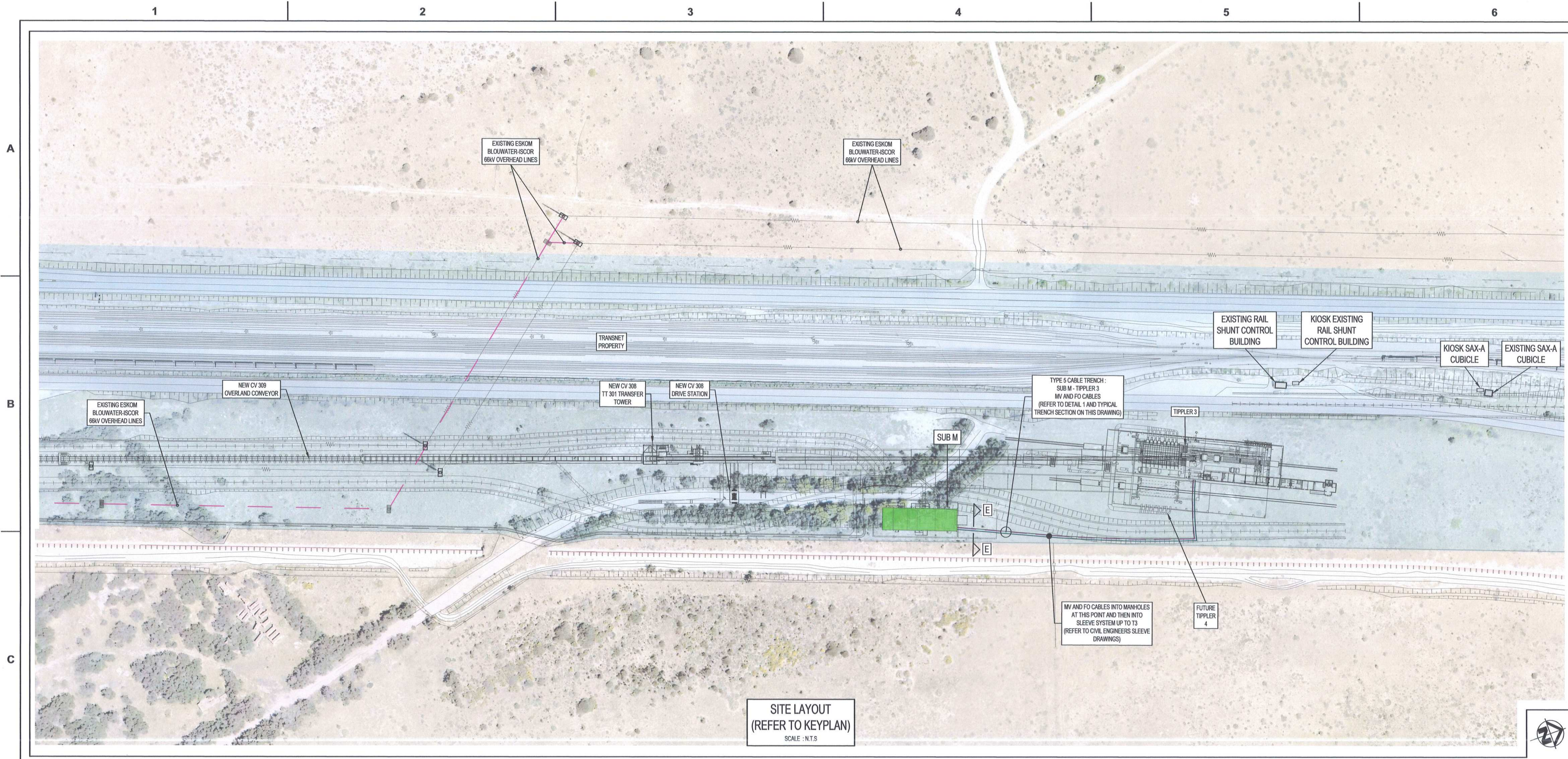
TITLE	NAME	SIGN	DATE
DRAWING	DD		18/04/18
CHECKED	DD		18/04/18
DESIGNED	BS		18/04/18
CHECKED	CP		18/04/18

**TRANSNET CAPITAL PROJECTS**  
TRANSNET LTD (FORMERLY TRANSNET CAPITAL PROJECTS) REG. NO. 180889000  
TABLE BAY BUILDING, TYNEBERRY PARK, 163 LYVINGS DRIVE, PLATTENBERG, TEL: 021 946 1999  
8001 FAX: 081 677 2455

**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT**  
BULK POWER UPGRADE -  
CABLE ROUTE TRENCH DETAILS  
TYPE 2

PROJECT NUMBER: 1924701123010E-DE-013-01-01-AE  
SHEET: 18/04/18



**NOTES:**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE MEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- ANY NEW INFRASTRUCTURE AS SHOWN ON THIS DRAWING MAY CHANGE DURING THE CONSTRUCTION PHASE.
- ALL NEW CABLE ROUTES SHALL BE FINALISED ON SITE, IN CONJUNCTION WITH THE EMPLOYER.
- THE CONTRACTOR SHALL WORK IN CLOSE CO-ORDINATION WITH ALL OTHER APPLICABLE CONTRACTORS TO AVOID OR MINIMIZE ANY CROSSINGS/CLASHES AS FAR AS PRACTICALLY POSSIBLE.
- FINAL CABLE ENTRIES/EXITS AT AND IN SUBSTATIONS TO BE CONFIRMED ON SITE WITH EMPLOYER.
- REFER TO CIVIL DRAWINGS FOR SLEEVE/MANHOLE DETAILS.
- ALL BEDDING AND PADDING MATERIAL TO HAVE A FINAL DRY SOIL MEASURED THERMAL RESISTIVITY OF 0.7 k.m/W.
- MV CABLES SIZES TO BE IN ACCORDANCE WITH THOSE SPECIFIED ON THE MV BLOCK AND SINGLE LINE DIAGRAMS.

REFER TO TECHNICAL SPECIFICATIONS REGARDING PROCEDURES TO BE UNDERTAKEN TO CONFIRM THE BEDDING AND PADDING MATERIAL REQUIRED SOIL THERMAL RESISTIVITY RATING, PRIOR TO INSTALLATION.

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 13665/006628/07

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION. "HOLD" CLOUD NOTE ADDED.	DD	CP	CP	2018-04-18
02	ISSUED FOR CONSTRUCTION.	DD	CP	CP	2018-03-19

**REVISIONS**

This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	DD		18 04 18
				CHECKED	DC		18 04 18
				DESIGNED	BS		18 04 18
				CHECKED	CP		18 04 18

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

PRE-ENG. / PR.TECH./PR. ARCH			
NAME	C P/M	DATE	

REG. NUMBER: 2012/0126  
SCALE: 1:NTS

**MASTER**  
23 APR 2018

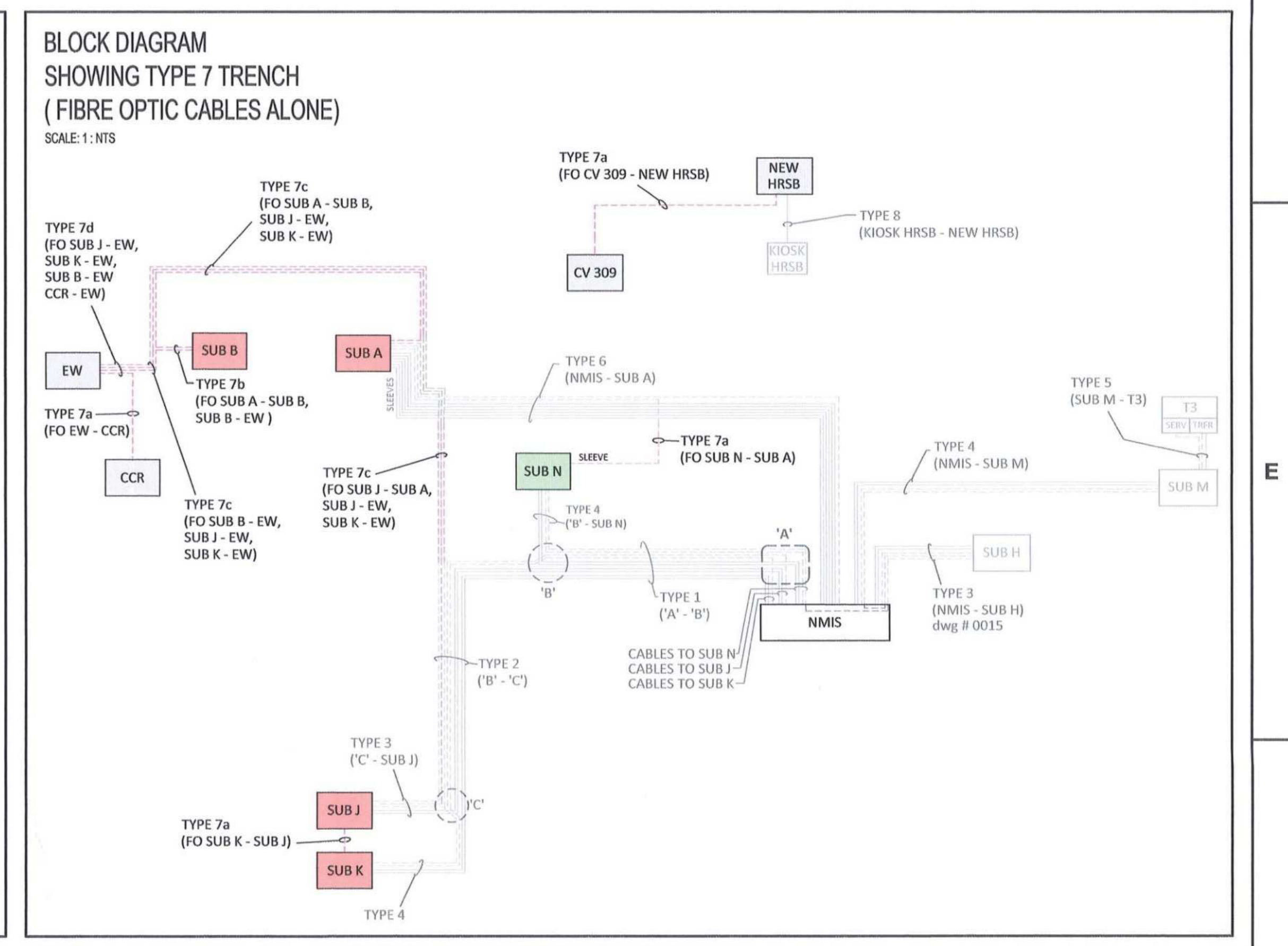
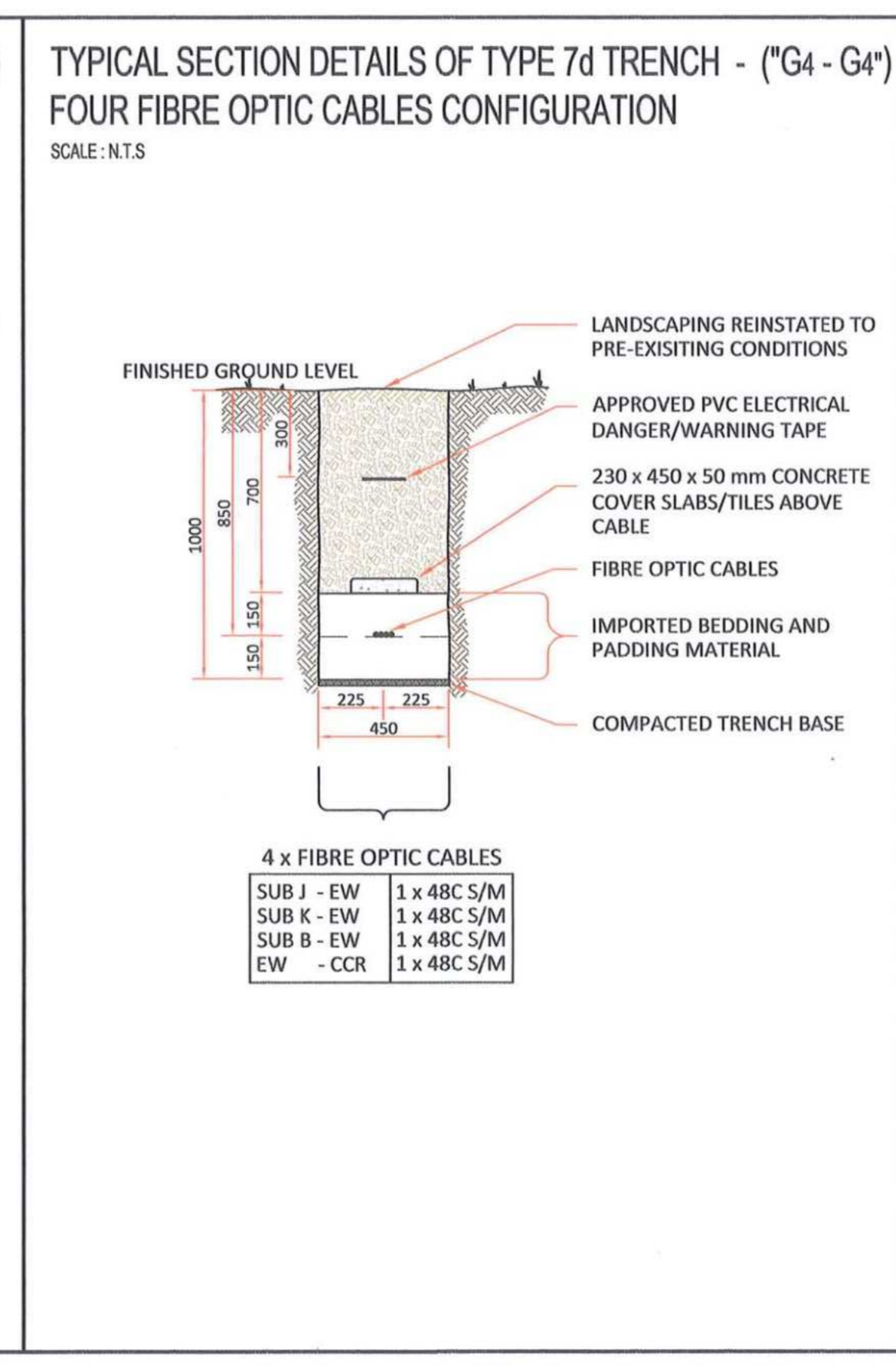
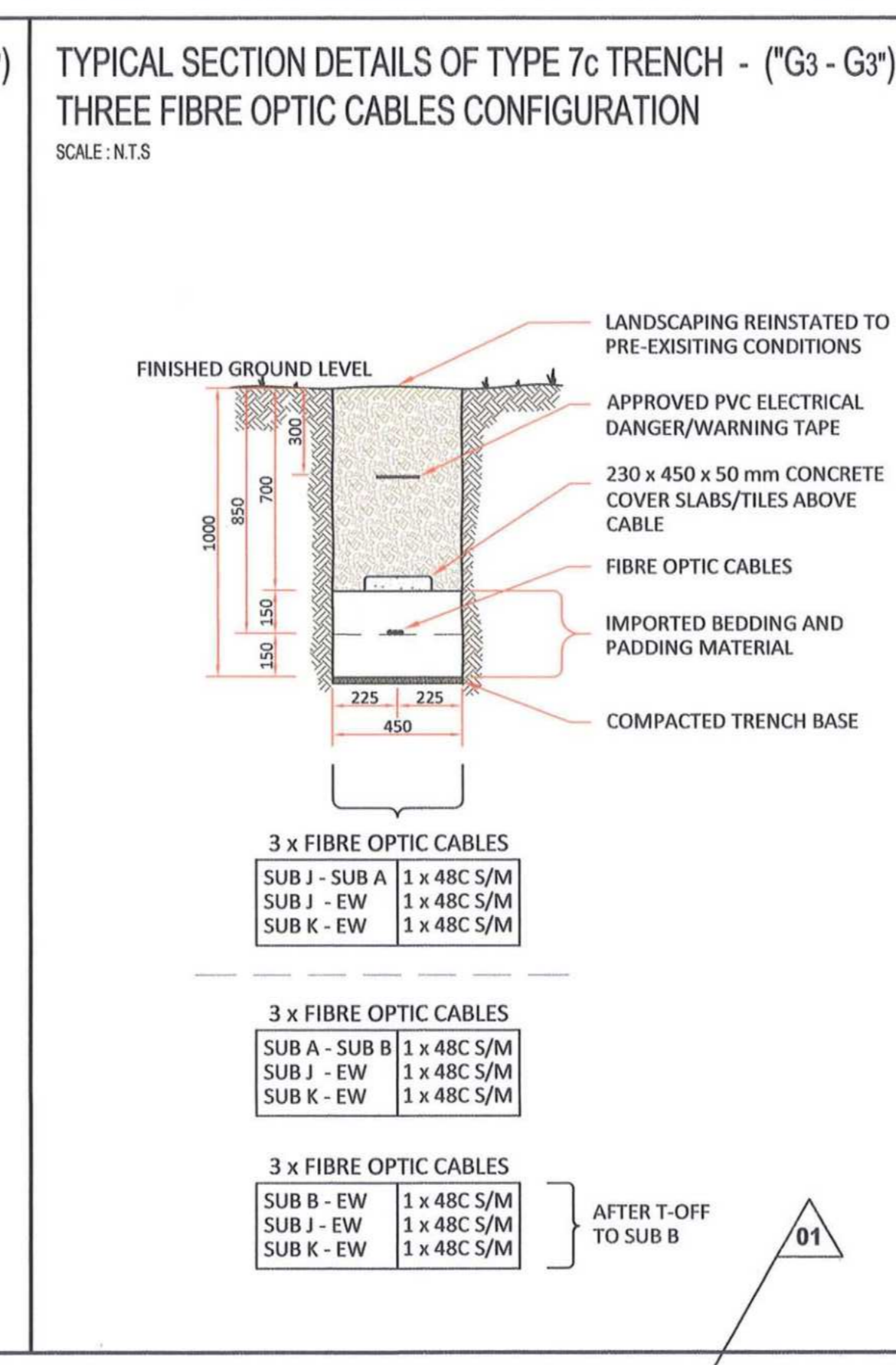
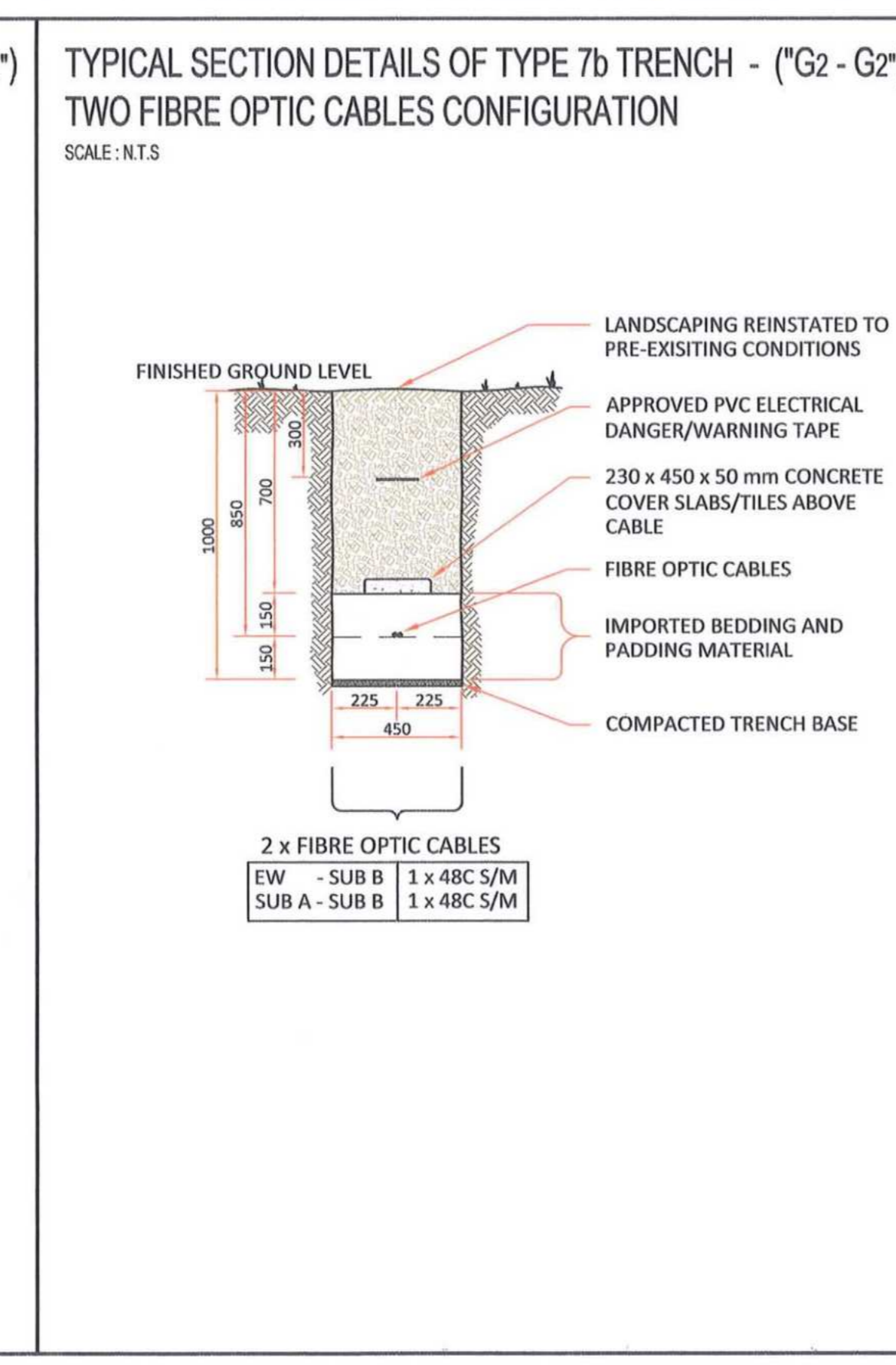
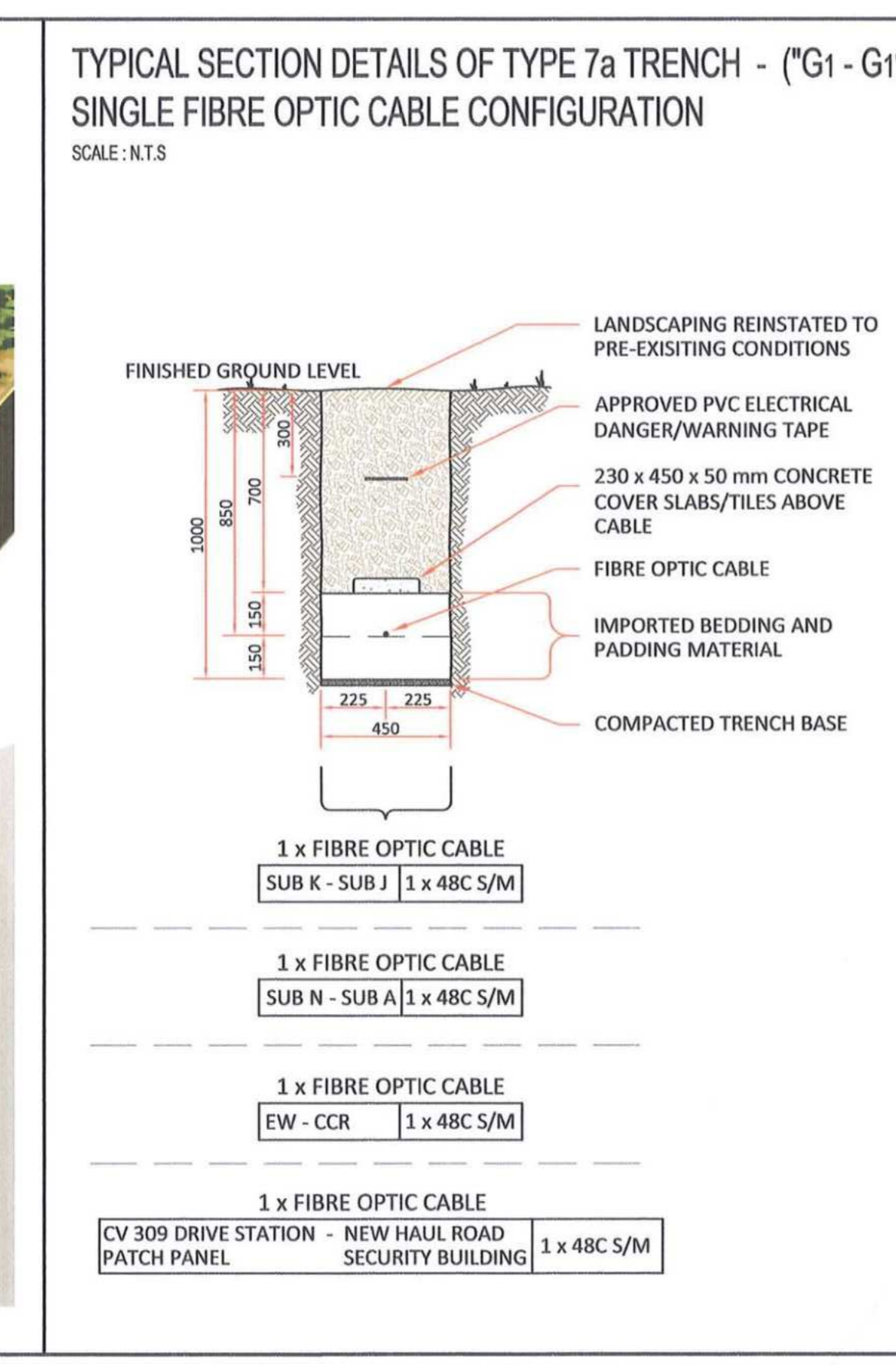
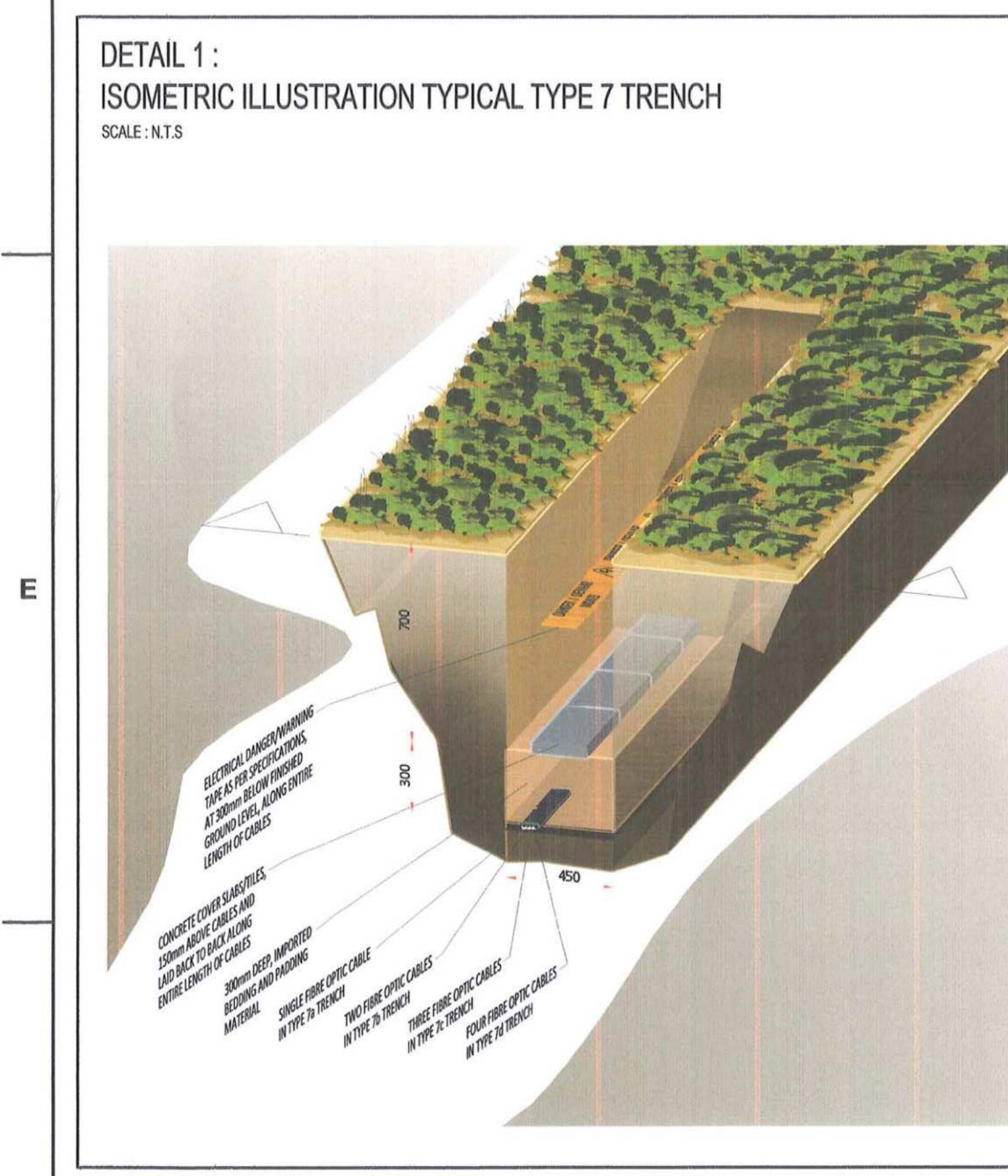
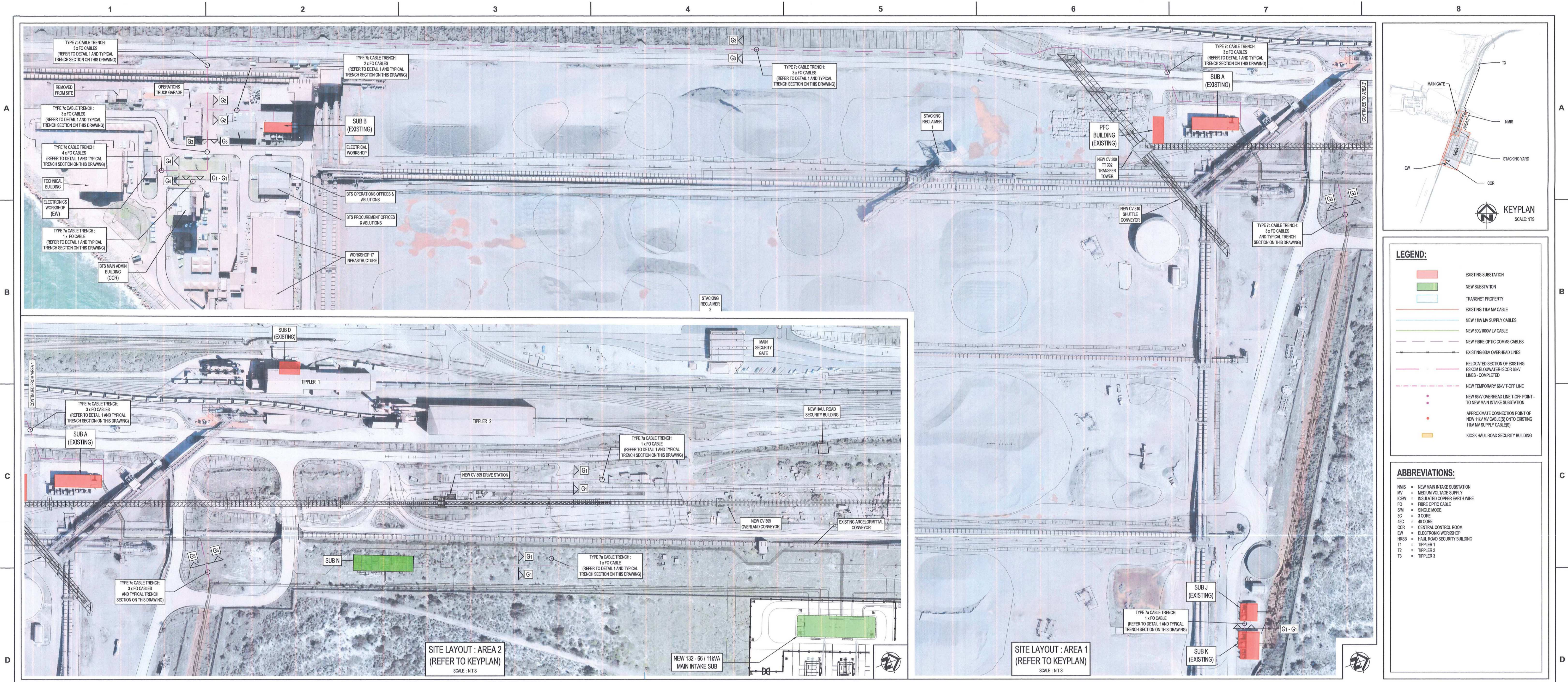
**AECOM** **TRANSNET**

Transnet Capital Projects  
TRANSNET LTD (ORAINED AS TRANSNET CAPITAL PROJECTS) REG. NO. 2008/0000000  
TABLE BAY BUILDING, TYGERSBERG PARK, TEL: 021 940 1990  
163 LITS HORSE DRIVE, PLATTENKOP, FAX: 085 677 2455

**PORT OF SALDANHA**

IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE :  
CABLE ROUTE TRENCH DETAILS  
TYPE 5

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
A0	19	2	4	7	01	1	2	3



**NOTES:**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- ANY NEW INFRASTRUCTURE AS SHOWN ON THIS DRAWING MAY CHANGE DURING THE CONSTRUCTION PHASE.
- ALL NEW CABLE ROUTES SHALL BE FINALISED ON SITE, IN CONJUNCTION WITH THE EMPLOYER.
- THE CONTRACTOR SHALL WORK IN CLOSE CO-ORDINATION WITH ALL OTHER APPLICABLE CONTRACTORS TO AVOID OR MINIMIZE ANY CROSSINGS/CLASHES AS FAR AS PRACTICALLY POSSIBLE.
- FINAL CABLE ENTRIES/EXITS AT AND IN SUBSTATIONS TO BE CONFIRMED ON SITE WITH EMPLOYER.
- REFER TO CIVIL DRAWINGS FOR SLEEVE/MANHOLE DETAILS.

**REFERENCE DRAWINGS**

DRAWING NO.	REFERENCE
1	
2	
3	
4	
5	
6	
7	
8	

**MASTER**  
23 APR 2018

**AECOM**

REFER TO TECHNICAL SPECIFICATIONS REGARDING PROCEDURES TO BE UNDERTAKEN TO CONFIRM THE BEDDING AND PADDING MATERIAL REQUIRED SOIL THERMAL RESISTIVITY RATING, PRIOR TO INSTALLATION.

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1966/006628/07

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION. "HOLD" CLOUD NOTE ADDED.	DD	CP	CP	2018-04-18
02	ISSUED FOR CONSTRUCTION	DD	CP	CP	2018-03-19

**CONTRACTOR / CONSULTANT**

TITLE	NAME	SGN	DATE
DRAWN	DD		18/04/18
CHECKED	DC		18/04/18
DESIGNED	BS		18/04/18
CHECKED	CP		18/04/18

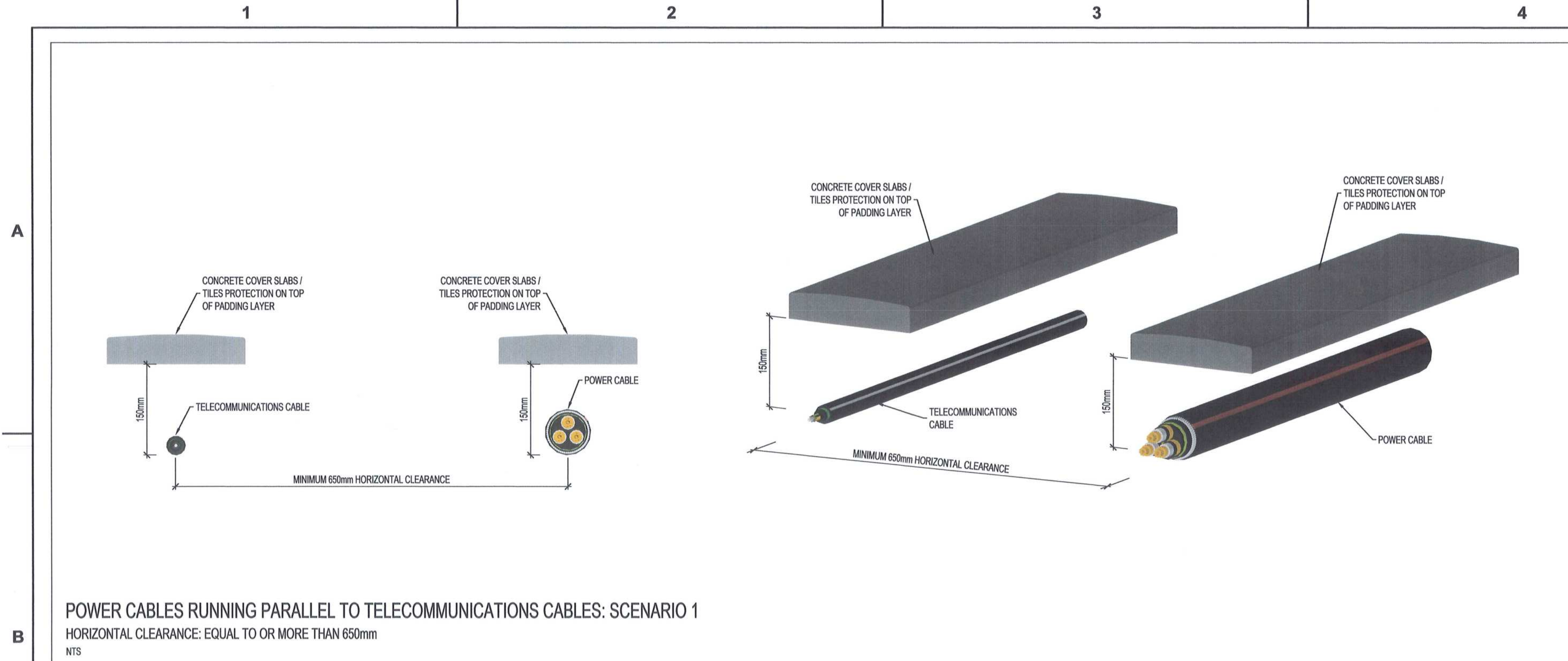
**OPERATING DIVISIONS**

TITLE	NAME	SGN	DATE
PRELIM / PRL TECH. PR. ANCH	C/PM		18/04/18
SIGNATURE			18/04/18
REG. NUMBER	5012/0126		
SCALE:	N.T.S.		

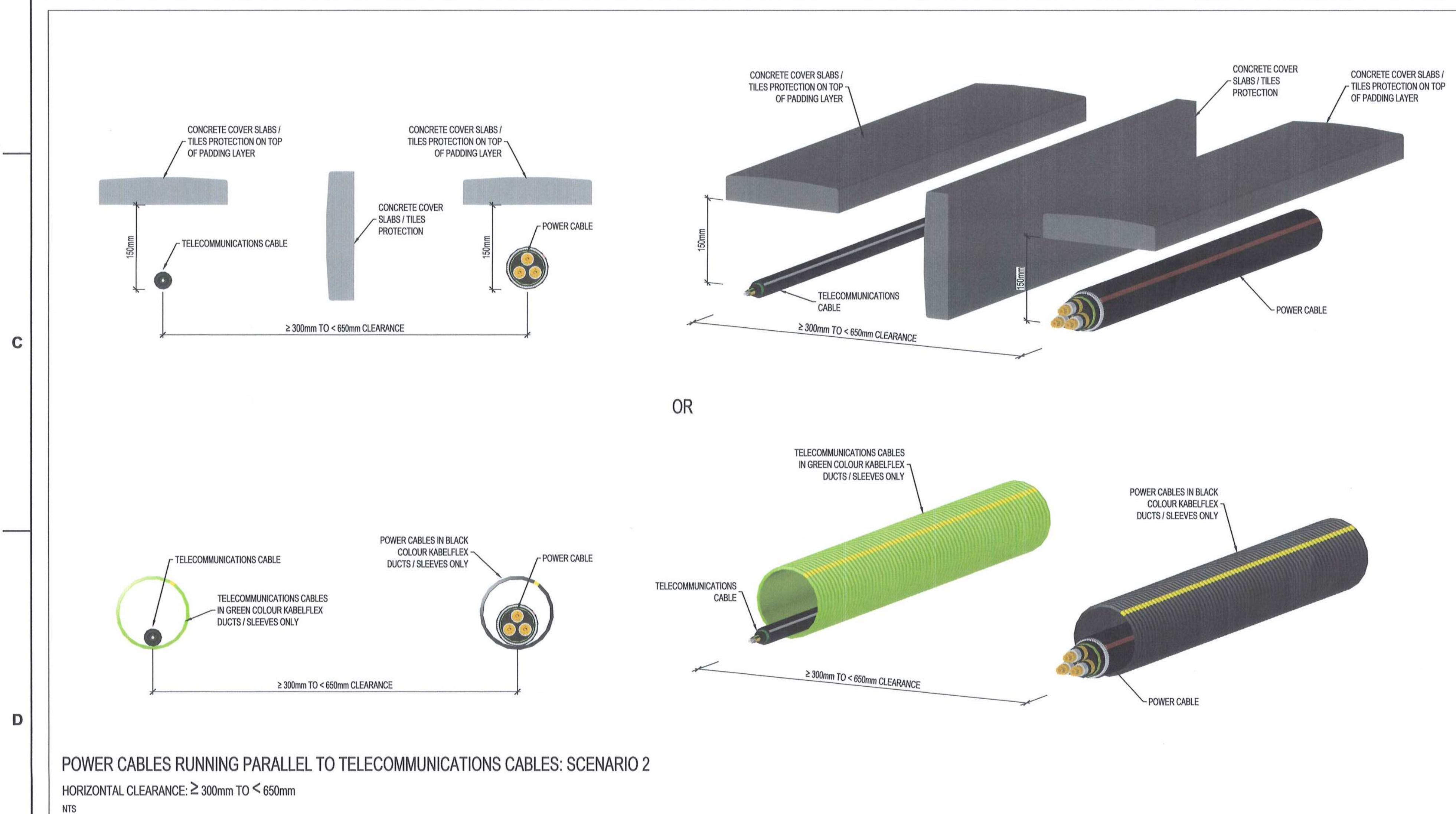
**TRANSNET CAPITAL PROJECTS**

**IRON ORE TIPPLER 3 PROJECT BULK POWER UPGRADE: CABLE ROUTE TRENCH DETAILS TYPE 7**

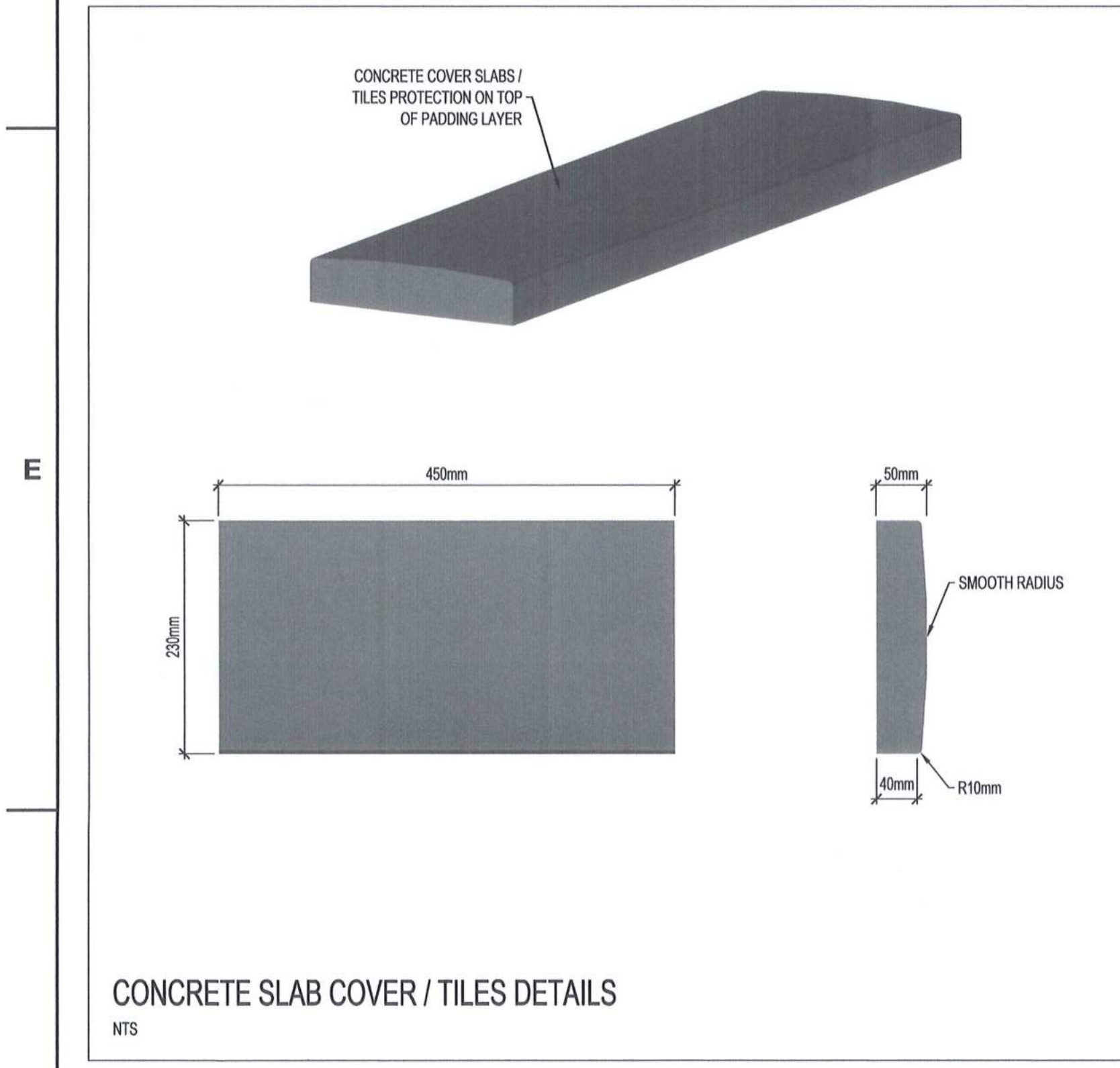
PROJECT NUMBER: AD192470123030E  
DIS: DE  
TYPE: 01  
DRAWING NO.: 18  
SHEET: 01  
REV: 01



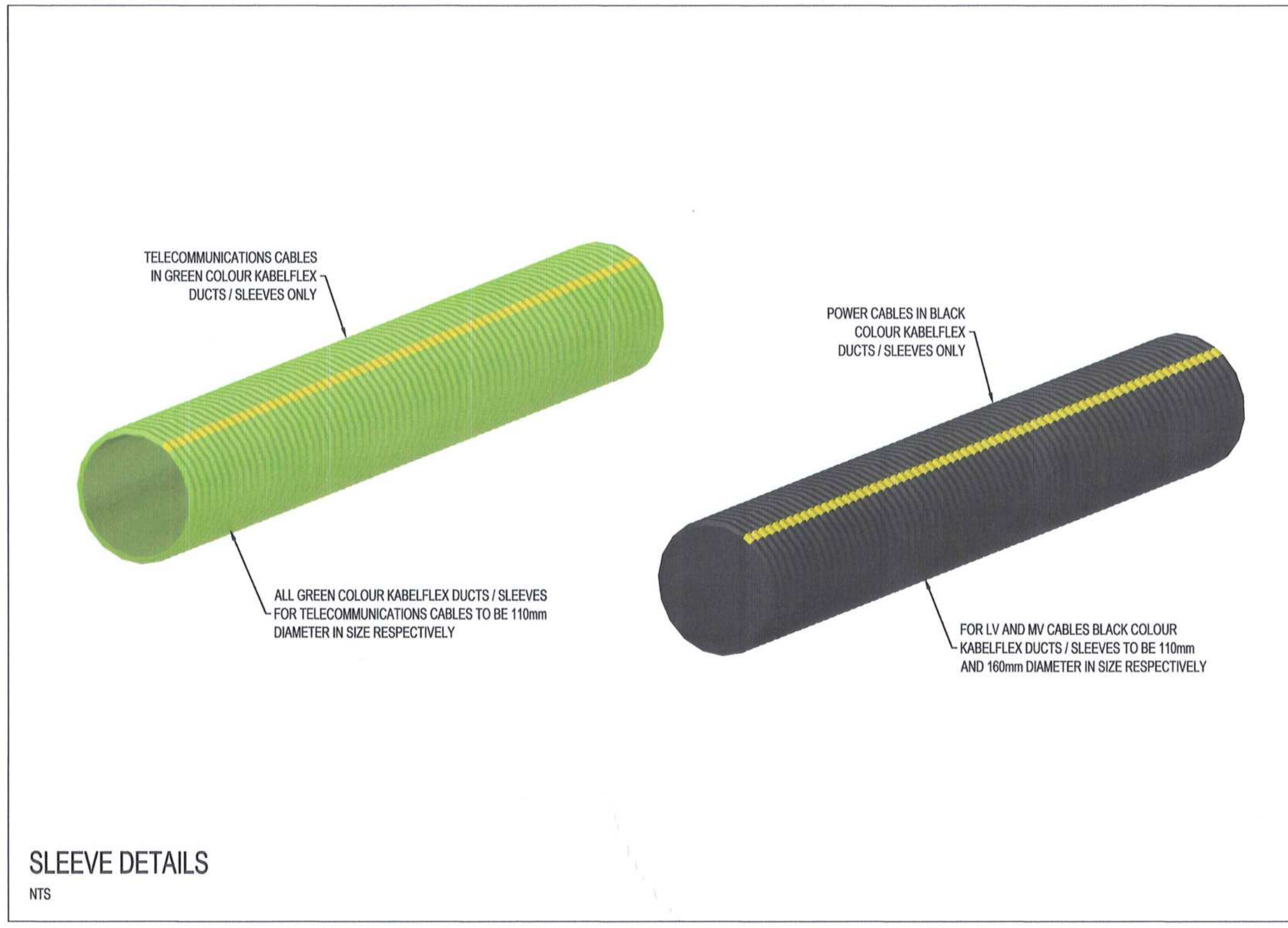
POWER CABLES RUNNING PARALLEL TO TELECOMMUNICATIONS CABLES: SCENARIO 1  
HORIZONTAL CLEARANCE: EQUAL TO OR MORE THAN 650mm  
NTS



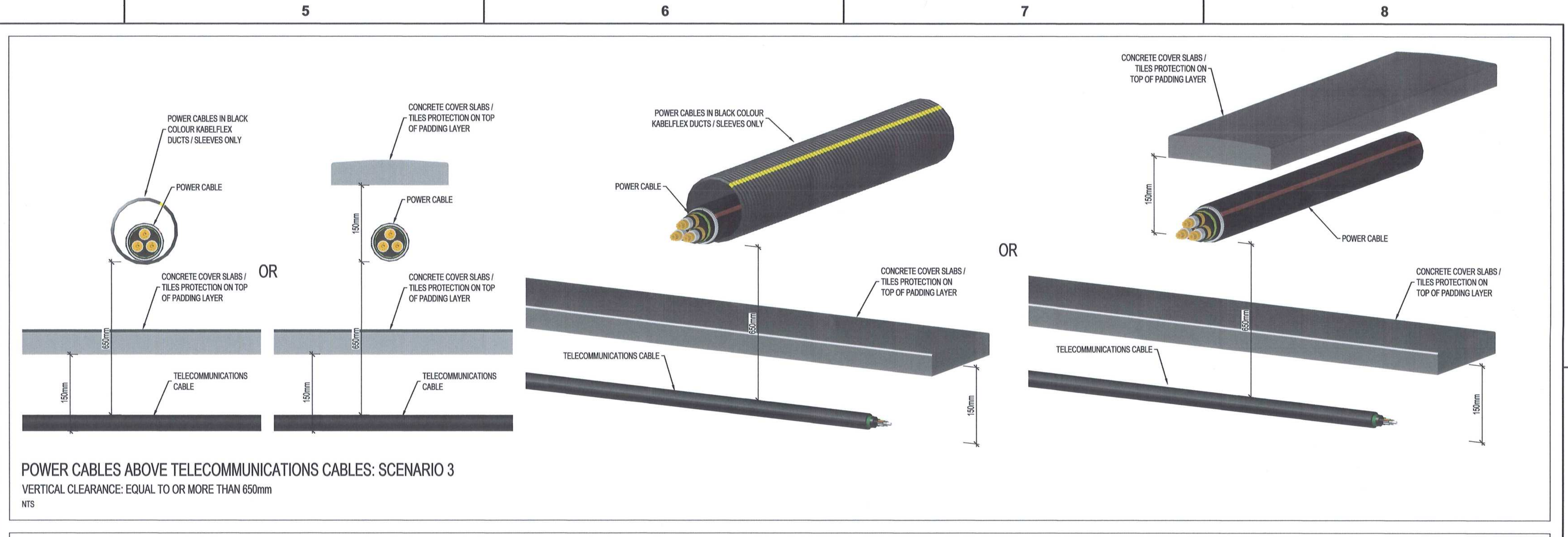
POWER CABLES RUNNING PARALLEL TO TELECOMMUNICATIONS CABLES: SCENARIO 2  
HORIZONTAL CLEARANCE: ≥ 300mm TO < 650mm  
NTS



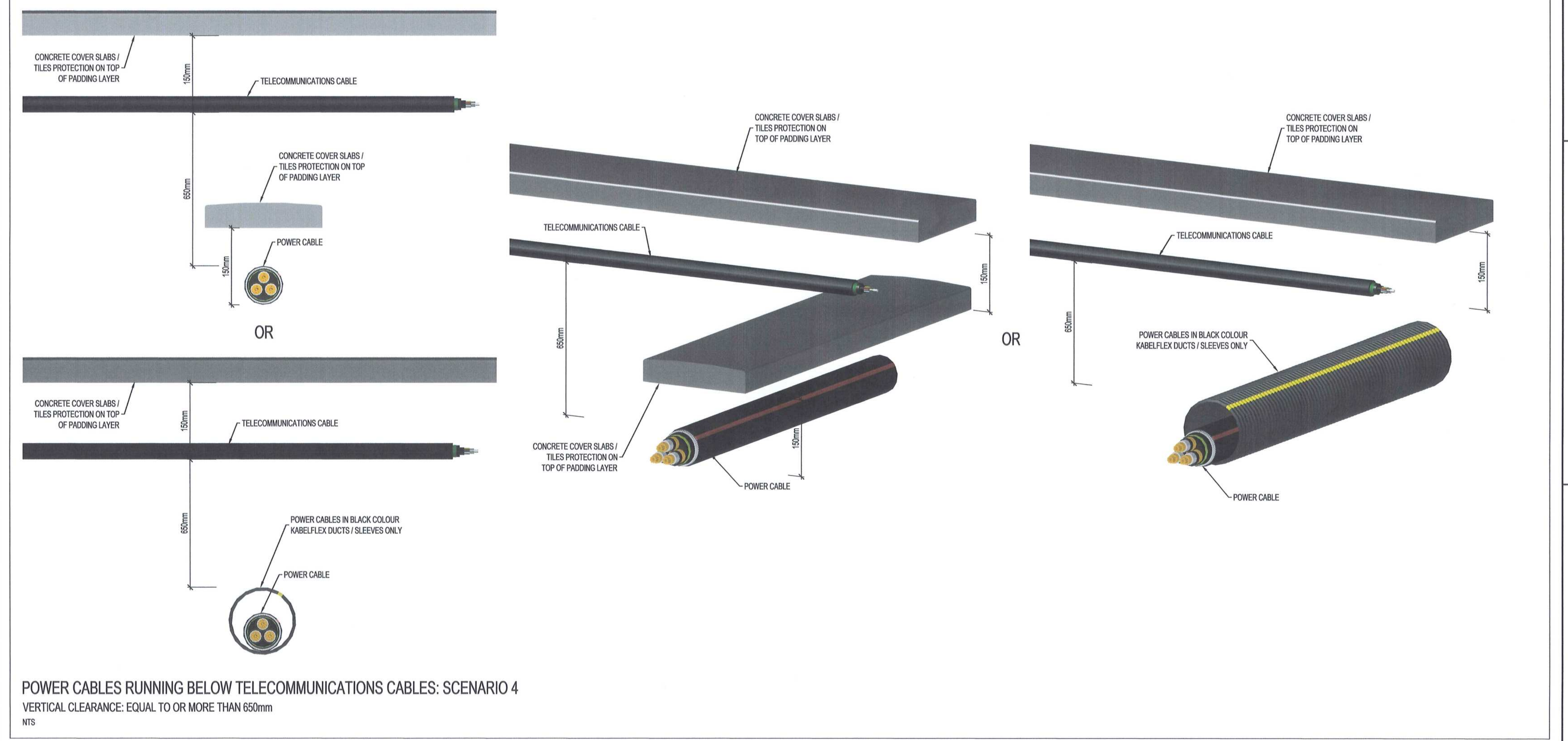
CONCRETE SLAB COVER / TILES DETAILS  
NTS



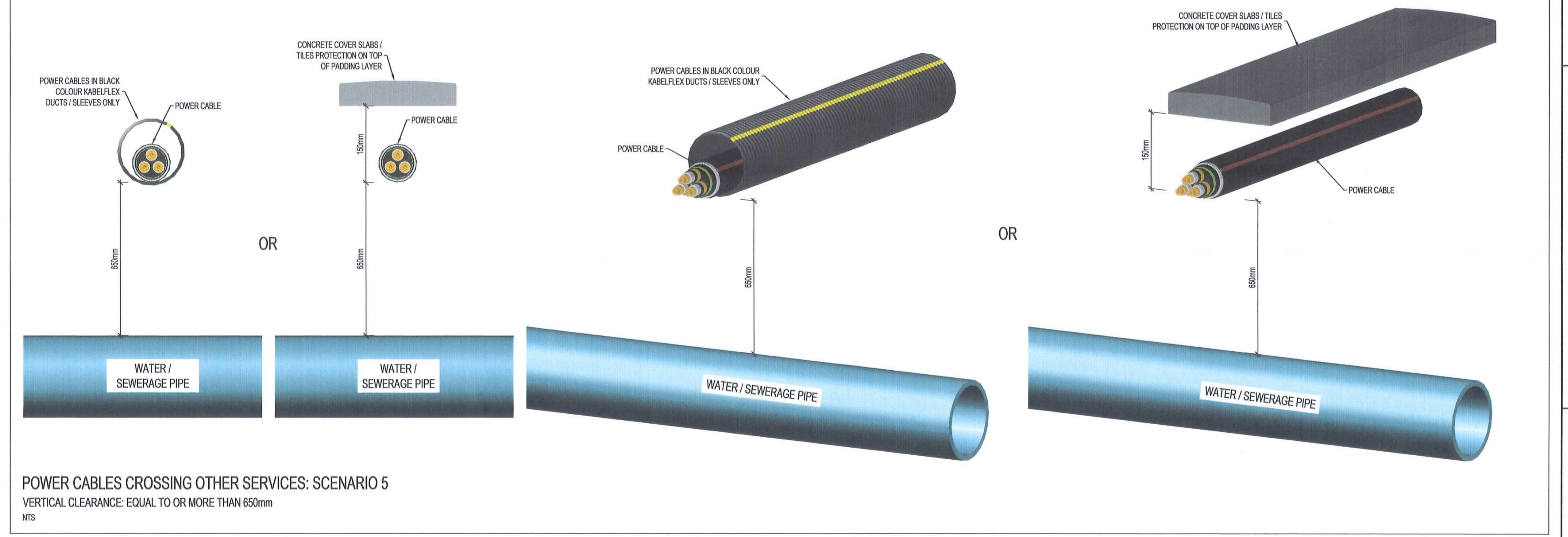
SLEEVE DETAILS  
NTS



POWER CABLES ABOVE TELECOMMUNICATIONS CABLES: SCENARIO 3  
VERTICAL CLEARANCE: EQUAL TO OR MORE THAN 650mm  
NTS



POWER CABLES RUNNING BELOW TELECOMMUNICATIONS CABLES: SCENARIO 4  
VERTICAL CLEARANCE: EQUAL TO OR MORE THAN 650mm  
NTS



POWER CABLES CROSSING OTHER SERVICES: SCENARIO 5  
VERTICAL CLEARANCE: EQUAL TO OR MORE THAN 650mm  
NTS

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE MEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- ALL CROSSINGS: CABLE LAID IN PIPE OR HALF PIPES, OR COVER TILES PROVIDED FOR A DISTANCE OF AT LEAST 2m ON EITHER SIDE OF CROSSINGS.
- FOR OTHER CLEARANCE AND / OR PROTECTION REQUIREMENTS, REFER TO CABLE ROUTE TRENCH DETAIL DRAWINGS AND TECHNICAL SPECIFICATIONS.
- CLEARANCES AND PROTECTION REQUIRED BETWEEN POWER CABLES, TELECOMMUNICATIONS CABLES AND OTHER SERVICES BASED ON MINIMUM STIPULATED BY APPLICABLE SANS STANDARDS AND EXPANDED UPON.
- THE CONTRACTOR SHALL CO-ORDINATE WITH ALL OTHER APPLICABLE CONTRACTORS TO AVOID OR MINIMISE CROSSINGS / CLASHES AS FAR AS PRACTICALLY POSSIBLE.

MASTER  
15 APR 2018  
AECOM

**AECOM**  
CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CHROMIE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

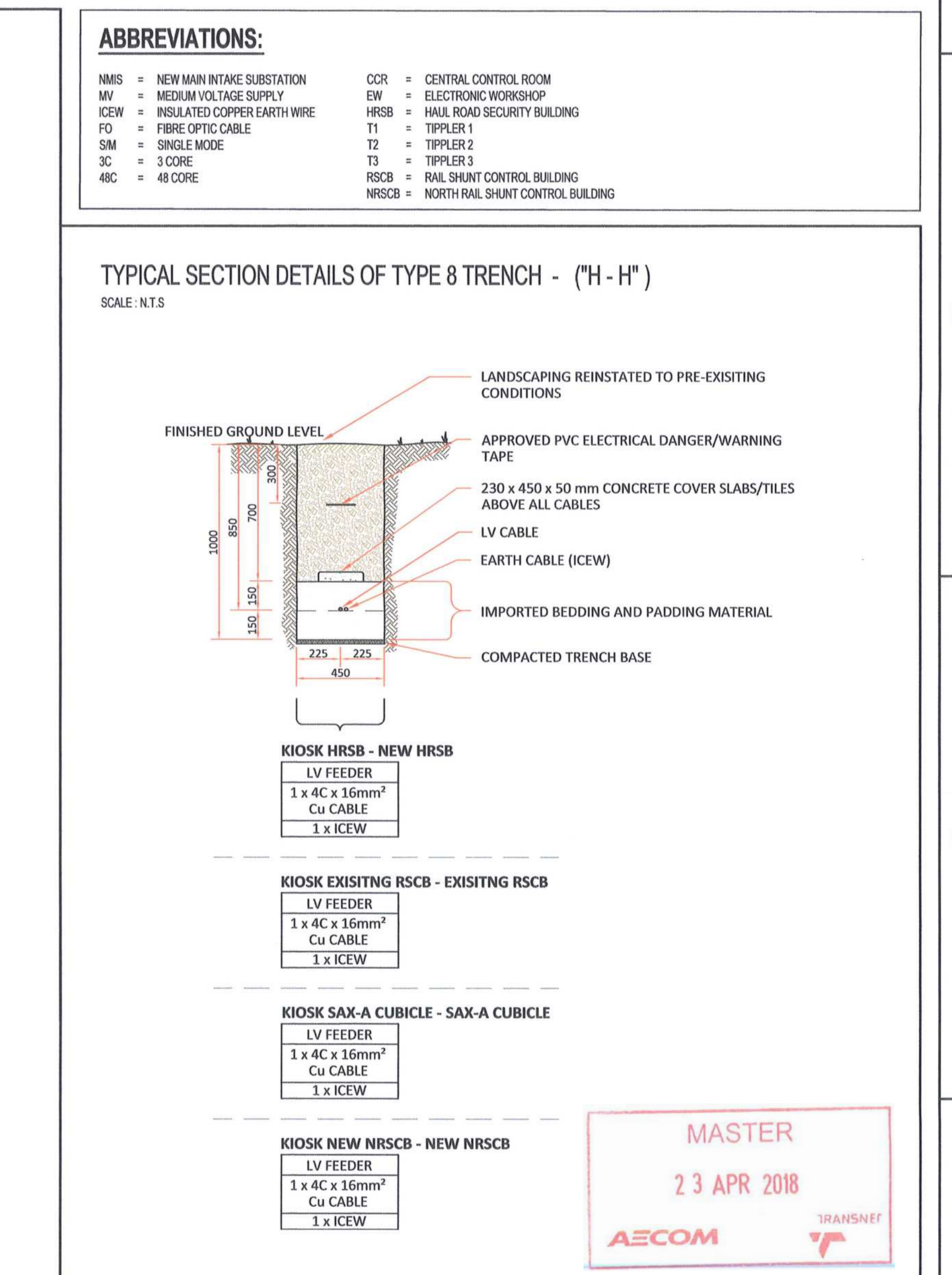
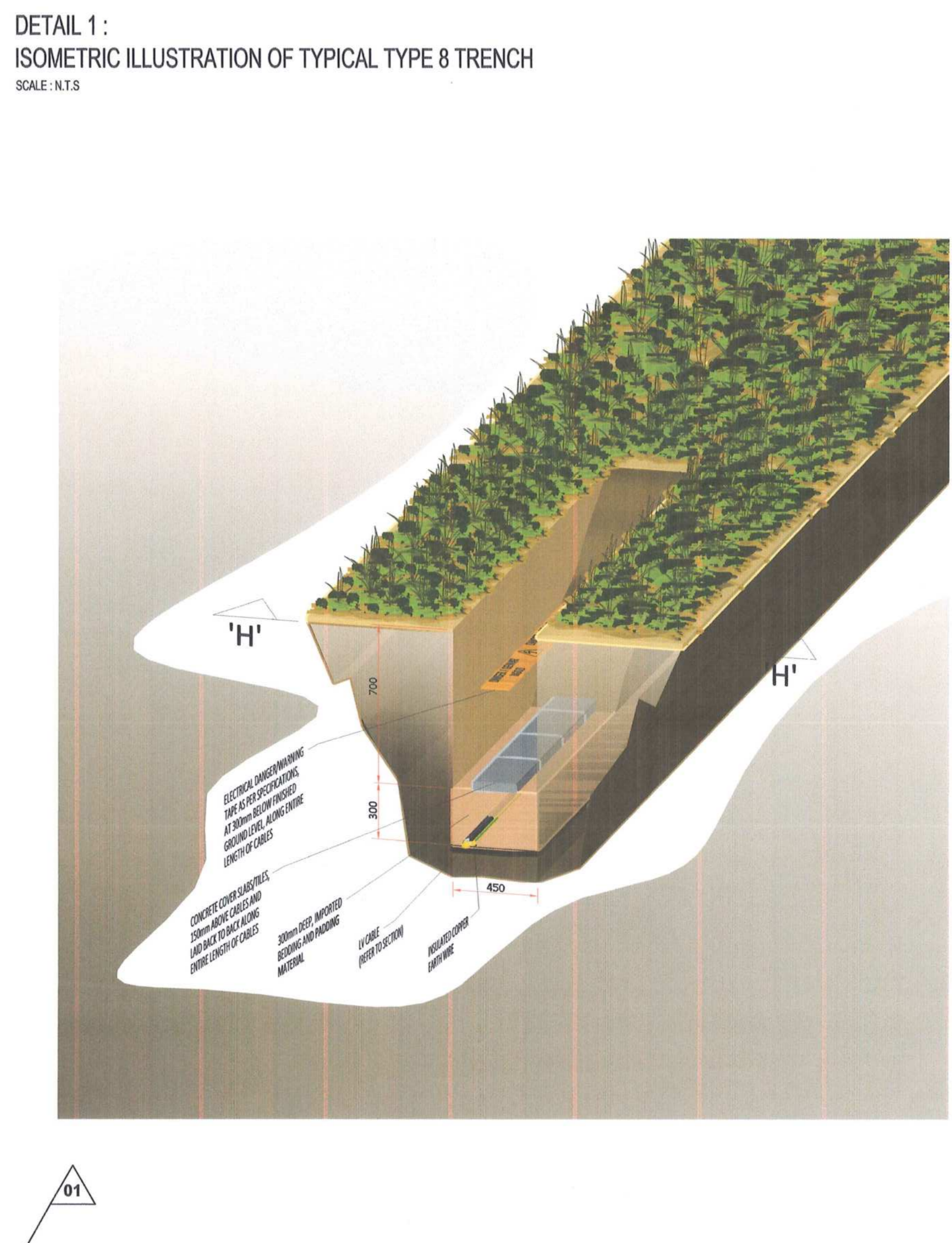
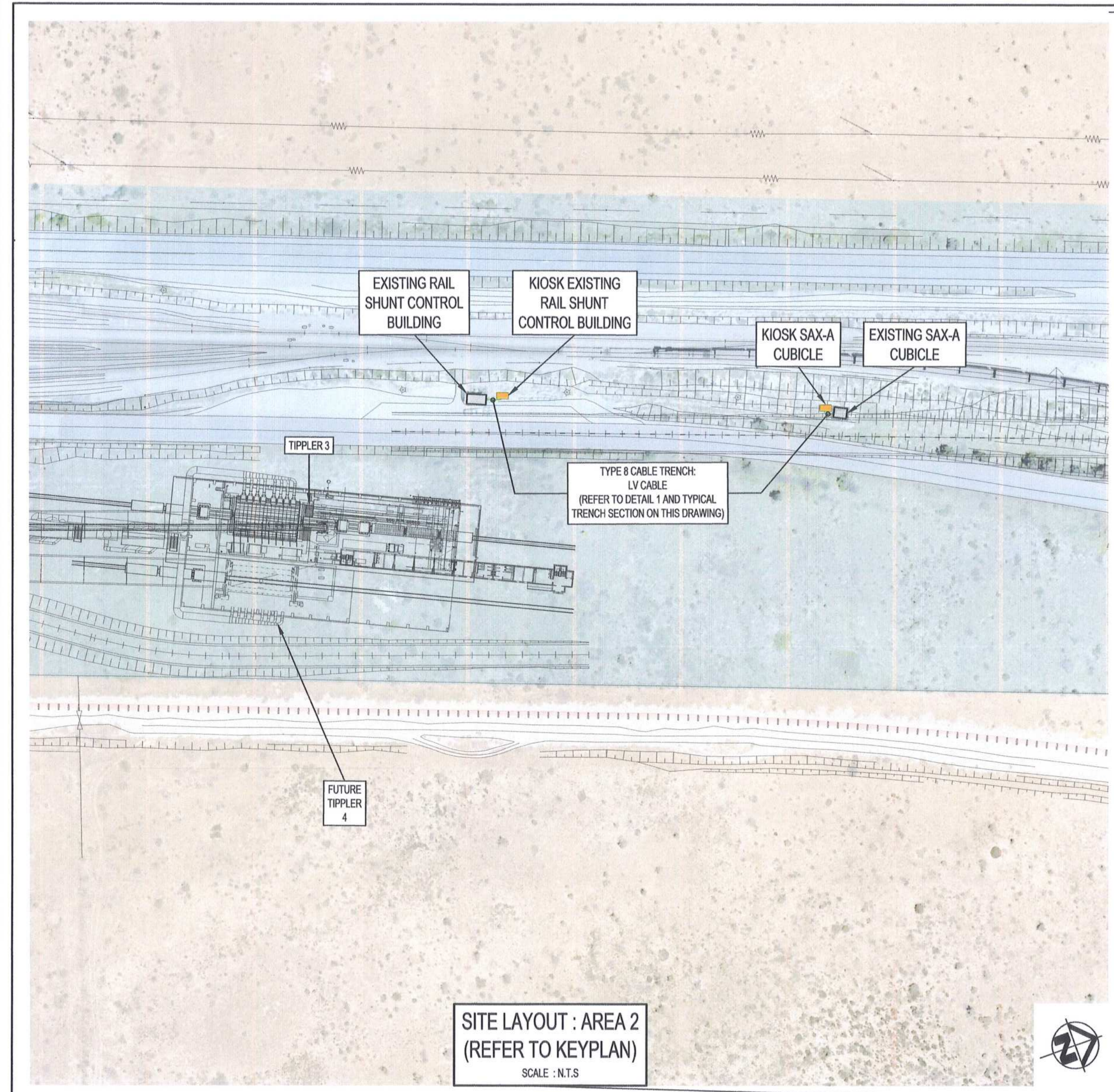
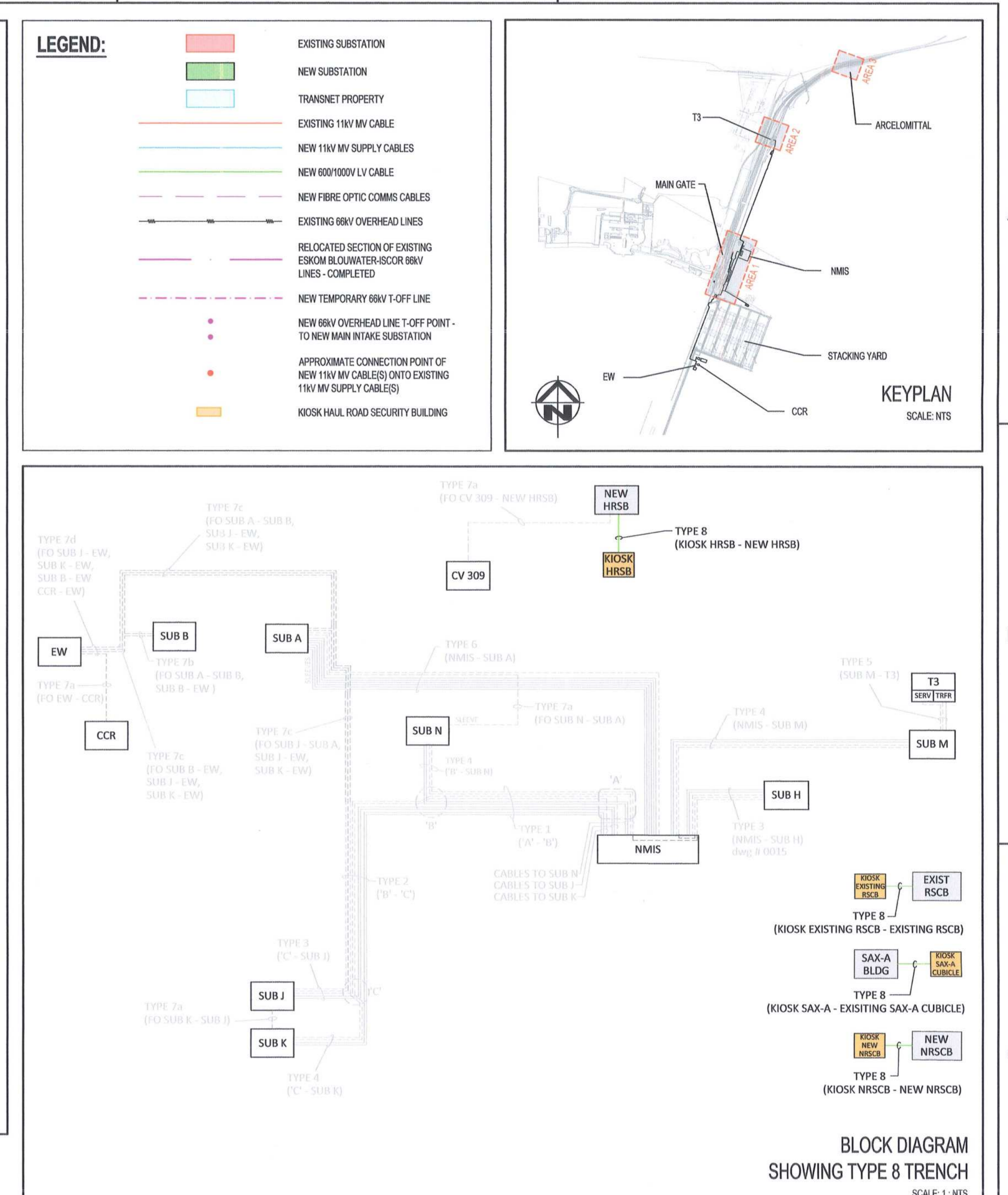
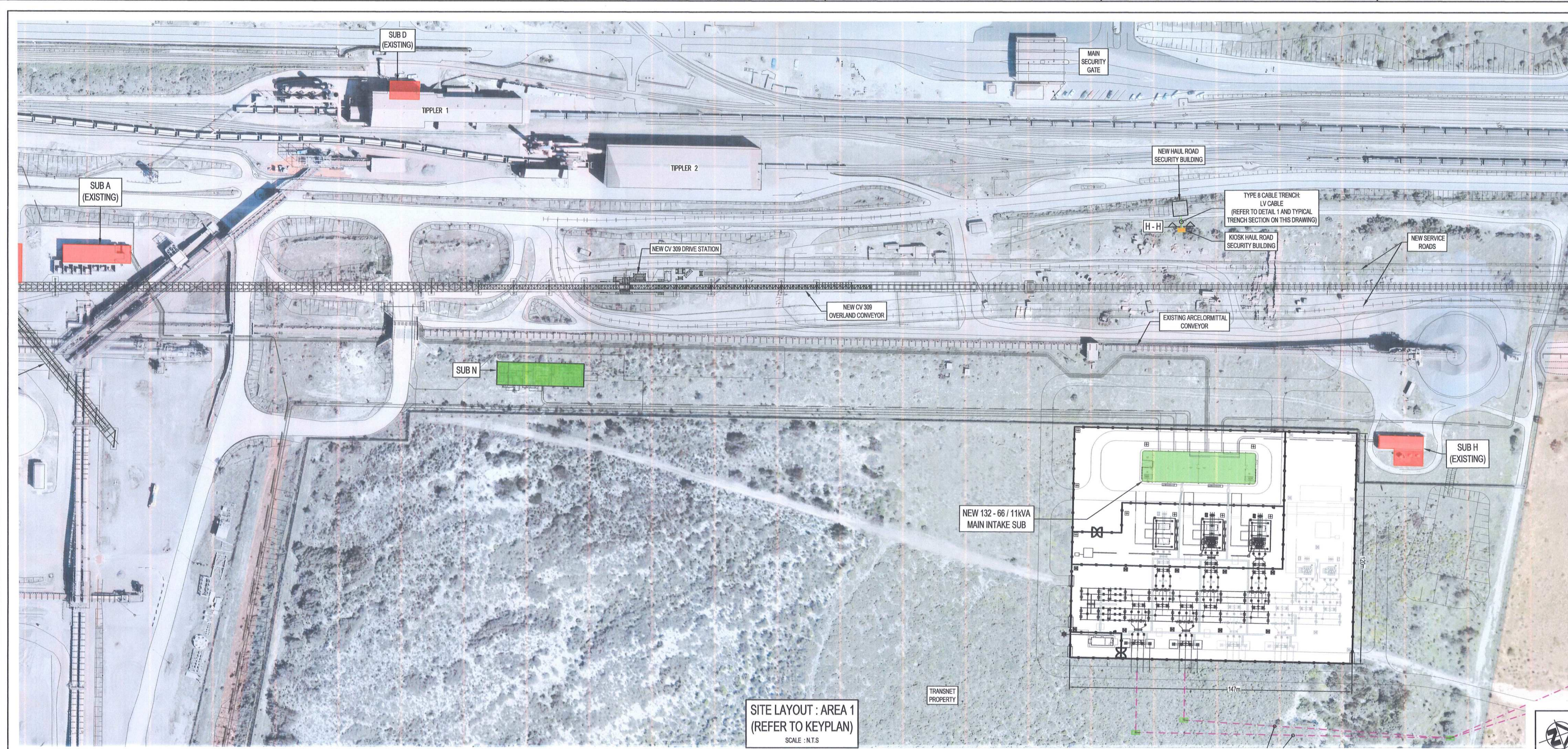
NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION	DD	BS	BS	2018-04-16

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	DD		18 04 16
				CHECKED	DC		18 04 16
				DESIGNED	LK		18 04 16
				CHECKED	BS		18 04 16

Transnet Capital Projects  
TRANSNET CAPITAL PROJECTS  
TABLE BAY BUILDING, TYGERBERG PARK,  
163 LYS KROGE DRIVE, PLATTENBERG COOP,  
8001  
TEL: 021 940 1999  
FAX: 021 671 2905

**PORT OF SALDANHA**  
IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE:  
CLOSE PROXIMITY OF SERVICES, CLEARANCES  
& PROTECTION REQUIREMENTS

PROJECT NUMBER	DD	PBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
AQ19247011	2	3	0	E	D	E	0	190100AE



**NOTES:**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- ANY NEW INFRASTRUCTURE AS SHOWN ON THIS DRAWING MAY CHANGE DURING THE CONSTRUCTION PHASE.
- ALL NEW CABLE ROUTES SHALL BE FINALISED ON SITE, IN CONJUNCTION WITH THE EMPLOYER.
- THE CONTRACTOR SHALL WORK IN CLOSE CO-ORDINATION WITH ALL OTHER APPLICABLE CONTRACTORS TO AVOID OR MINIMIZE ANY CROSSINGS/COLLISIONS AS FAR AS PRACTICALLY POSSIBLE.
- FINAL CABLE ENTRIES/EXITS AT AND IN SUBSTATIONS TO BE CONFIRMED ON SITE WITH EMPLOYER.
- REFER TO CIVIL DRAWINGS FOR SLEEVE/MANHOLE DETAILS.
- ALL BEDDING AND PADDING MATERIAL TO HAVE A FINAL DRY SOIL MEASURED THERMAL RESISTIVITY OF 0.7 kV.m/V.
- MV CABLES SIZES TO BE IN ACCORDANCE WITH THOSE SPECIFIED ON THE MV BLOCK AND SINGLE LINE DIAGRAMS.
- REFER TO TECHNICAL SPECIFICATIONS REGARDING PROCEDURES TO BE UNDERTAKEN TO CONFIRM THE BEDDING AND PADDING MATERIAL REQUIRED SOIL THERMAL RESISTIVITY RATING, PRIOR TO INSTALLATION.

**REFERENCE DRAWINGS**

DRAWING NO.	REFERENCE
1	
2	
3	
4	
5	
6	
7	
8	

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION. TRENCHES FOR LV CABLES, ADDED BETWEEN EXISTING SHUNT RAIL CNTRL BLDG, SAX-A BLDG, NEW NORTH SHUNT RAIL CNTRL BLDG, AND THEIR RESPECTIVE LV SUPPLY KIOSKS. "HOLD" CLOSD NOTE ADDED.	DD	CP	CP	2018-04-18
02	ISSUED FOR CONSTRUCTION	DD	CP	CP	2018-03-19

**CONTRACTOR / CONSULTANT**

TITLE	NAME	SIGN	DATE

**OPERATING DIVISIONS**

TITLE	NAME	SIGN	DATE

**TRANSNET CAPITAL PROJECTS**

TITLE	NAME	SIGN	DATE

**PR. ENG. / PR. TECH. / PR. ARCH**

NAME	C P/V	DATE

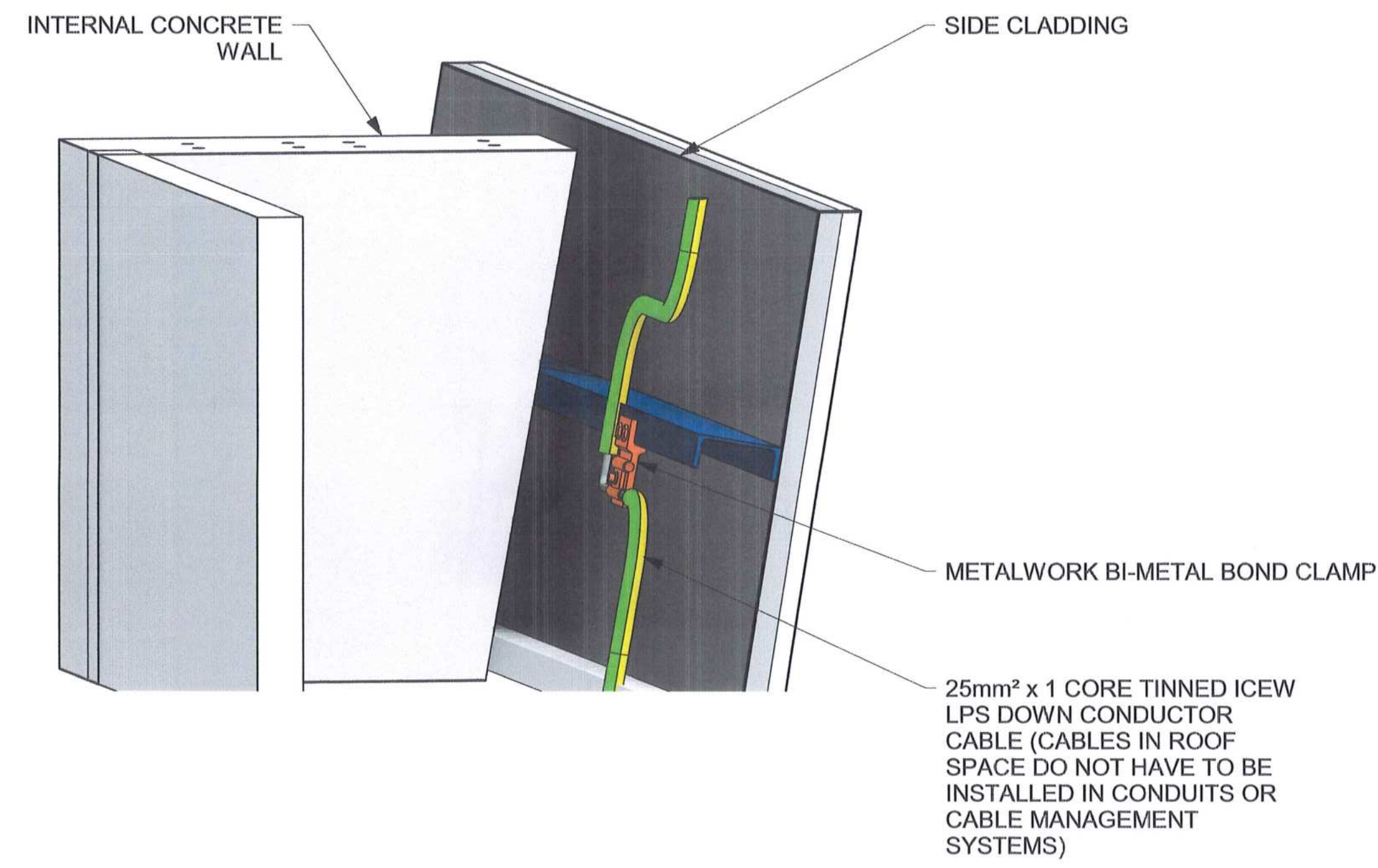
**TRANSNET CAPITAL PROJECTS**  
TRANSNET LTD (CHANGED AS TRANSNET CAPITAL PROJECTS) REG. NO. 196666666  
TABLE BAY BUILDING, TYGERBERG PARK, TEL: 021 940 1999  
103 LYS PRINCE DRIVE, PLATTEKLOOF, TEL: 021 940 2455  
FAX: 021 940 2455

**PORT OF SALDANHA**

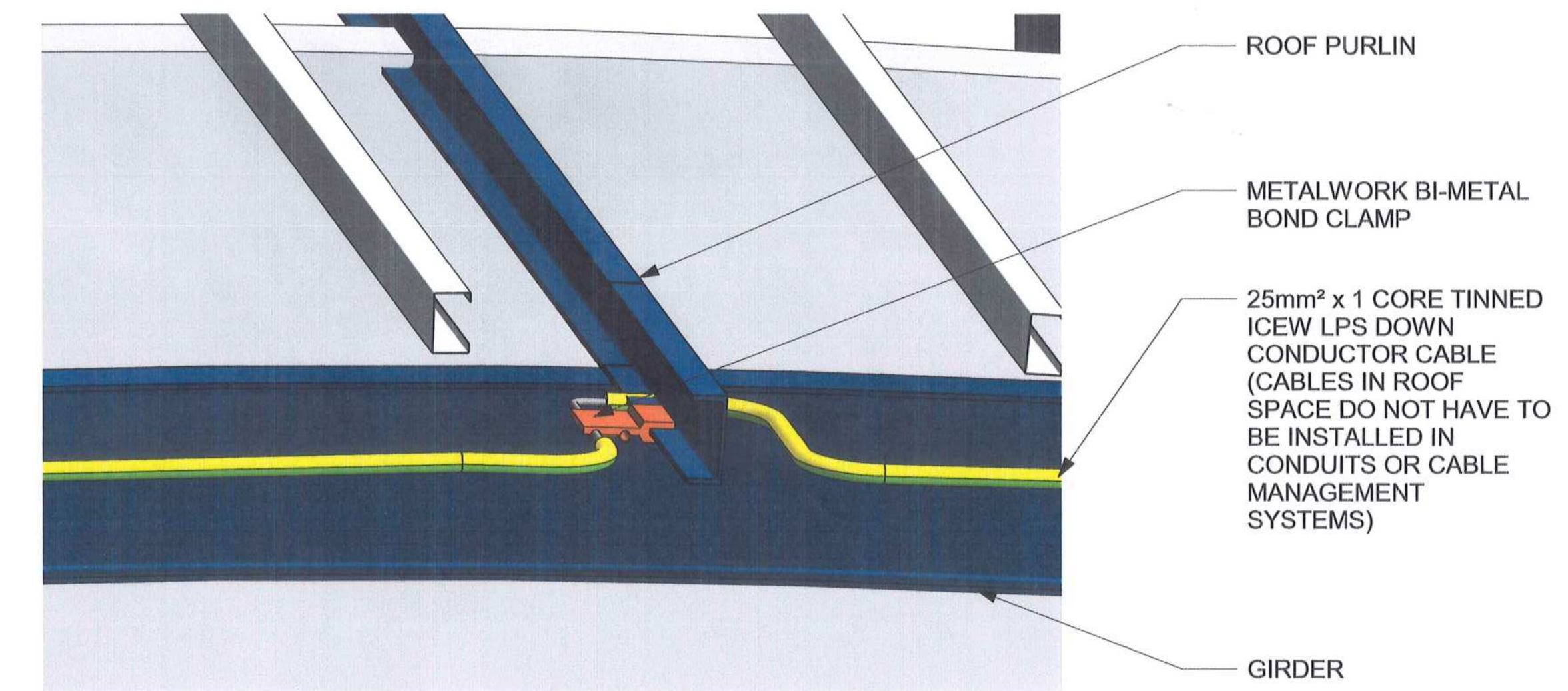
**IRON ORE TIPPLER 3 PROJECT**  
BULK POWER UPGRADE :  
CABLE ROUTE TRENCH DETAILS  
TYPE 8

PROJECT NUMBER: 192470112300E-DE-0029-01-01-AE  
DRAWING NO.: SHEET 101

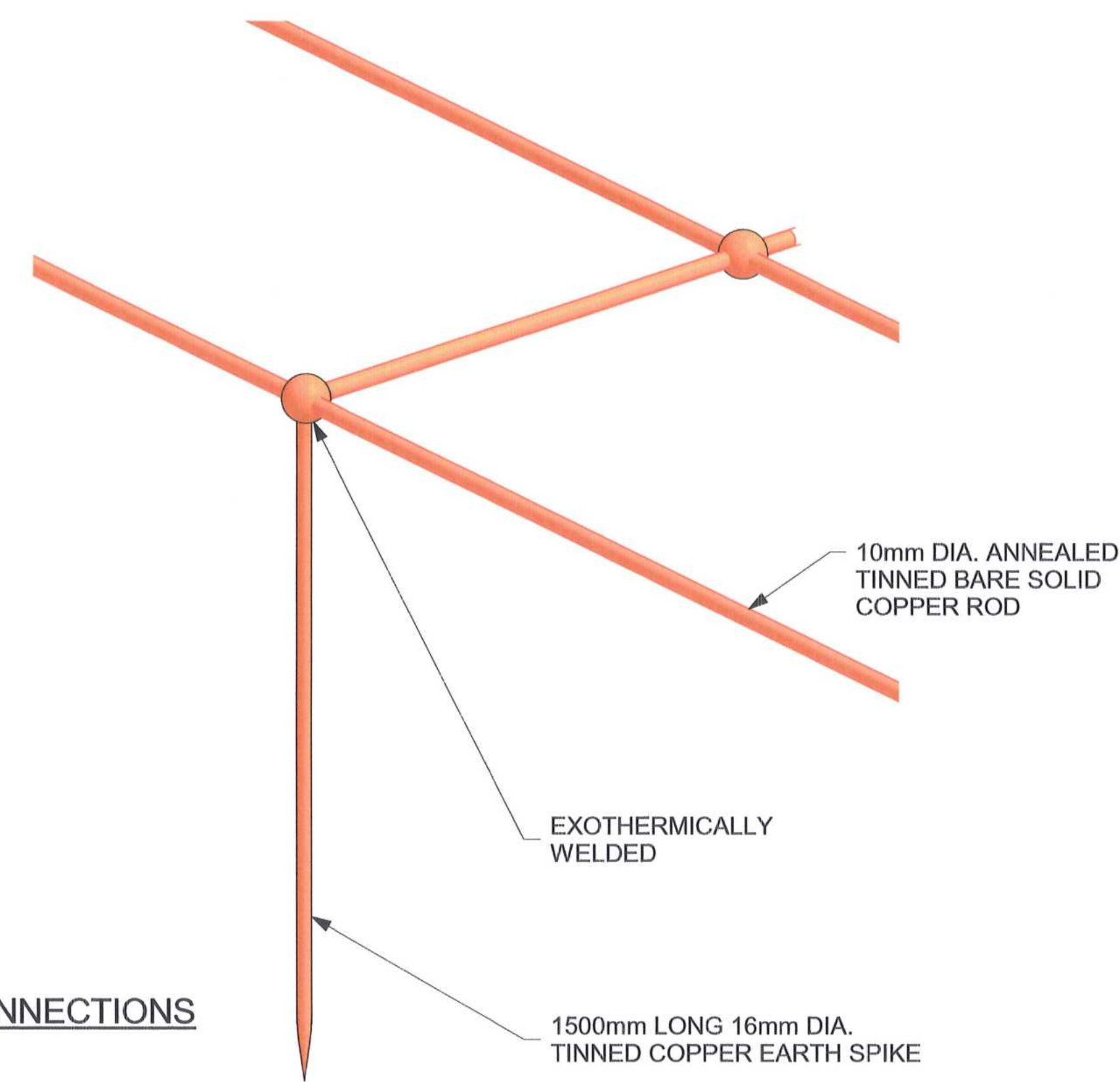
DRAWING NO.	REFERENCE
1	
2	
3	
4	
5	
6	
7	
8	



1 TYPICAL 3D DETAIL - EARTHING TO PURLINS  
DE-0030-01 SCALE N.T.S.

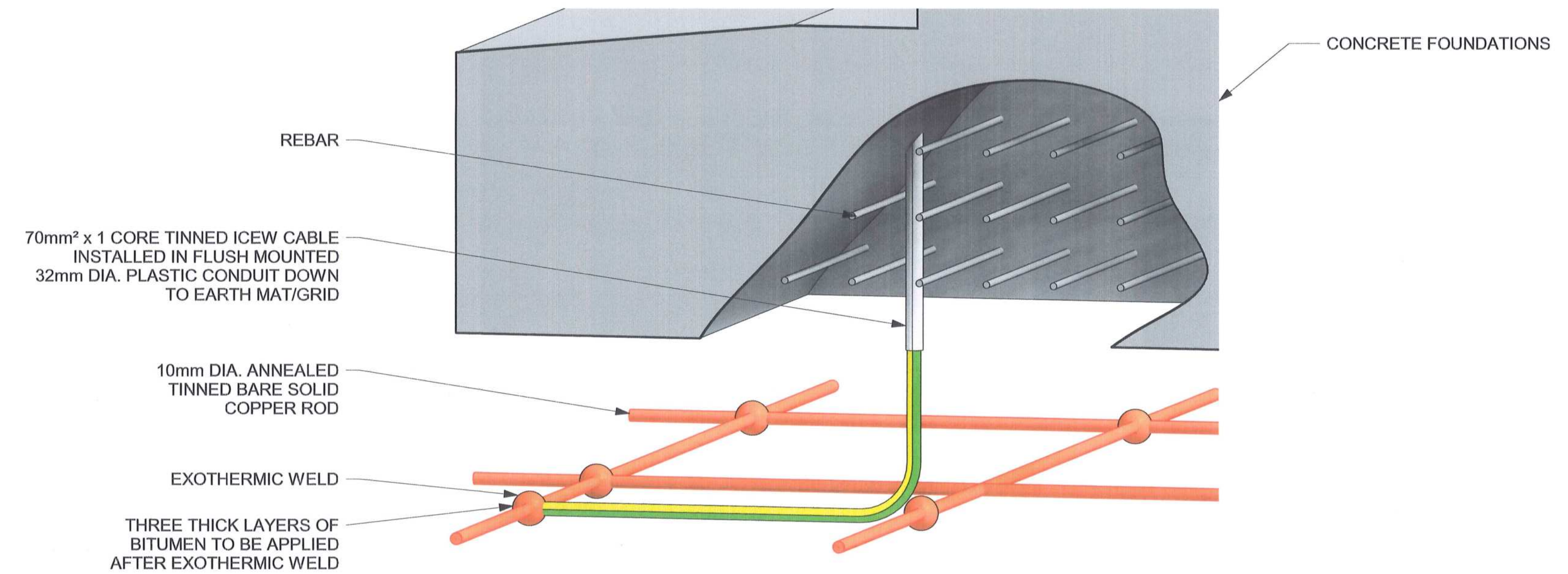


2 TYPICAL 3D DETAIL - EARTHING TO ROOF PURLINS  
DE-0030-01 SCALE N.T.S.



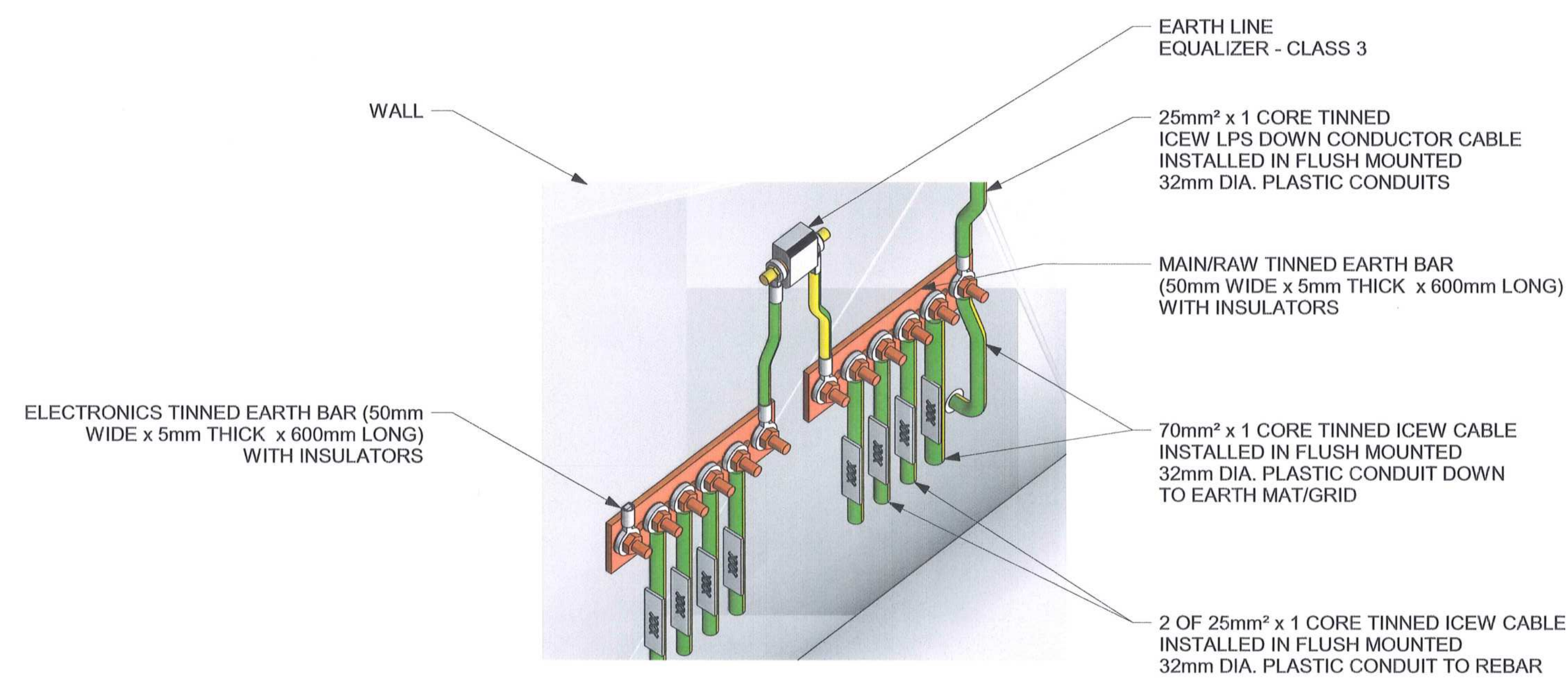
NOTE:  
AT NEW MAIN INTAKE SUBSTATION,  
BARE SOLID COPPER RODS & EARTH  
SPIKES ARE NOT TINNED  
(TO ESKOM SPECIFICATIONS)

3 TYPICAL 3D DETAIL - EARTH MAT & SPIKE CONNECTIONS  
DE-0030-01 SCALE N.T.S.

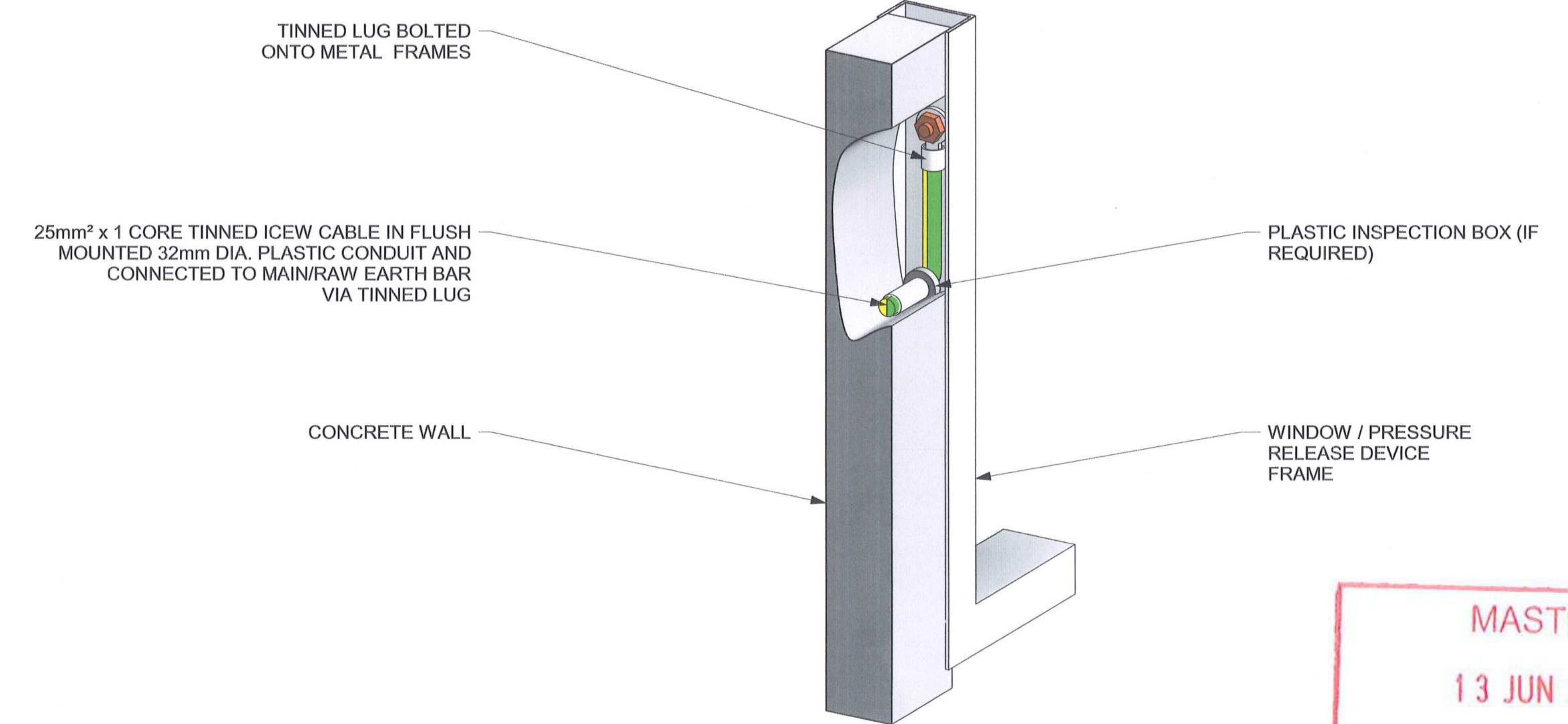


4 TYPICAL 3D DETAIL - EARTHING OF ICEW CABLES TO EARTH MAT  
DE-0030-01 SCALE N.T.S.

AWAITING FINAL DESIGN FROM  
EARTHING AND LPS  
SPECIALIST SUB-CONTRACTOR



5 TYPICAL 3D DETAIL - EARTH BARS  
DE-0030-01 SCALE N.T.S.



6 TYPICAL 3D DETAIL - EARTHING TO WINDOW & PRESSURE RELEASE DEVICE FRAMES  
DE-0030-01 SCALE N.T.S.

MASTER  
13 JUN 2018  
AECOM TRANSNET

NOTES

- DO NOT SCALE DRAWINGS - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- ALL STEEL/METAL WORK SHALL BE ELECTRICALLY CONTINUOUS.
- ALL STEEL/METAL WORK SHALL BE BONDED BY A MINIMUM SIZED 25mm<sup>2</sup> TINNED Cu ICEW, UNLESS OTHERWISE SPECIFIED OR INSTRUCTED.
- REBAR TO REBAR CONNECTIONS SHALL BE BONDED BY MINIMUM SIZED 25mm<sup>2</sup> TINNED ICEW, UNLESS OTHERWISE SPECIFIED OR INSTRUCTED.
- ALL CONNECTIONS ONTO EARTH GRID/MAT SHALL BE EXOTHERMICALLY WELDED, UNLESS OTHERWISE SPECIFIED OR INSTRUCTED.
- CONNECTIONS ONTO ROOF PURLINS etc. SHALL ONLY BE BY MEANS OF METALWORK BI-METAL BOND CLAMPS, UNLESS OTHERWISE SPECIFIED OR INSTRUCTED.

- REFER TO OTHER EARTHING AND LIGHTNING PROTECTION SYSTEM DETAIL DRAWINGS AND EARTH GRID LAYOUT DRAWINGS FOR ANY ADDITIONAL INFORMATION AS APPLICABLE.
- GALVANIC CORROSION BETWEEN MATERIALS SHALL BE AVOIDED AT ALL TIMES.
- LPS SYSTEM BASED ON CLASS IV TYPE.
- NO EARTH CONNECTIONS SHALL BE COVERED UP BEFORE THE EMPLOYER HAS INSPECTED AND APPROVED THEM.
- THREE THICK LAYERS OF BITUMEN TO BE APPLIED ON ANY EXOTHERMIC WELD OR BRAZED POINTS, WHERE APPLICABLE.
- ALL MAIN/RW EARTH BARS SHALL BE CONNECTED TO ONE ANOTHER VIA 3 x 95mm<sup>2</sup> x 1 CORE TINNED ICEW CABLES.

- ALL ELECTRONICS EARTH BARS SHALL BE ISOLATED FROM THE MAIN/RW EARTH/LPS SYSTEM, AND LINKED TO THE MAIN/RW EARTH BAR VIA A CLASS 3 EARTH LINE EQUALIZER, UNLESS OTHERWISE SPECIFIED OR INSTRUCTED.
- FOR ANY OTHER CONNECTIONS WHICH MAY NOT APPEAR ON THE DRAWINGS, THE CONTRACTOR SHALL NOTIFY THE EMPLOYER, WHICH WILL MAKE A RULING AS TO WHICH CONNECTION TYPE TO BE USED.
- STEEL/METAL/CONCRETE INFRASTRUCTURE ILLUSTRATIVE ONLY AND MAY NOT REFLECT ACTUAL INFRASTRUCTURE TO BE CONSTRUCTED.
- ALL LPS DOWN & EARTHING CONDUCTORS TO BE PROPERLY LABELED, SHOWING AMONGST OTHERS, THEIR PURPOSE.
- ALL LPS DOWN CONDUCTORS SHALL BE SUPPLIED WITH LPS TEST BOXES, UNLESS OTHERWISE SPECIFIED OR INSTRUCTED.
- ALL LPS & EARTHING INFRASTRUCTURE'S FINAL POSITIONS SHALL BE CONFIRMED ON-SITE IN CONJUNCTION WITH THE EMPLOYER.

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/00628/07

CONTRACTOR/CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	DATE	TITLE	DATE
		DRAWN	18 06 12
		CHECKED	18 06 12
		DESIGNED	18 06 12
		CHECKED	18 06 12

OPERATING DIVISIONS		PR.ENG./PR.TECH./PR.ARCH	
TITLE	DATE	TITLE	DATE
		SIGNATURE	19 06 12
		REG. NUMBER	2542126
		SCALE	N.T.S.

REVISIONS	
NO	DESCRIPTION
03	ISSUED FOR CONSTRUCTION

CONTRACTOR/CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	DATE	TITLE	DATE
		DRAWN	18 06 12
		CHECKED	18 06 12
		DESIGNED	18 06 12
		CHECKED	18 06 12

OPERATING DIVISIONS		PR.ENG./PR.TECH./PR.ARCH	
TITLE	DATE	TITLE	DATE
		SIGNATURE	19 06 12
		REG. NUMBER	2542126
		SCALE	N.T.S.

PROJECT INFORMATION	
PROJECT NUMBER	DESCRIPTION
19 24 7 0 1	IRON ORE TIPPLER 3 PROJECT BULK POWER UPGRADE: EARTHING & LIGHTNING PROTECTION SYSTEM - EARTHING DETAILS

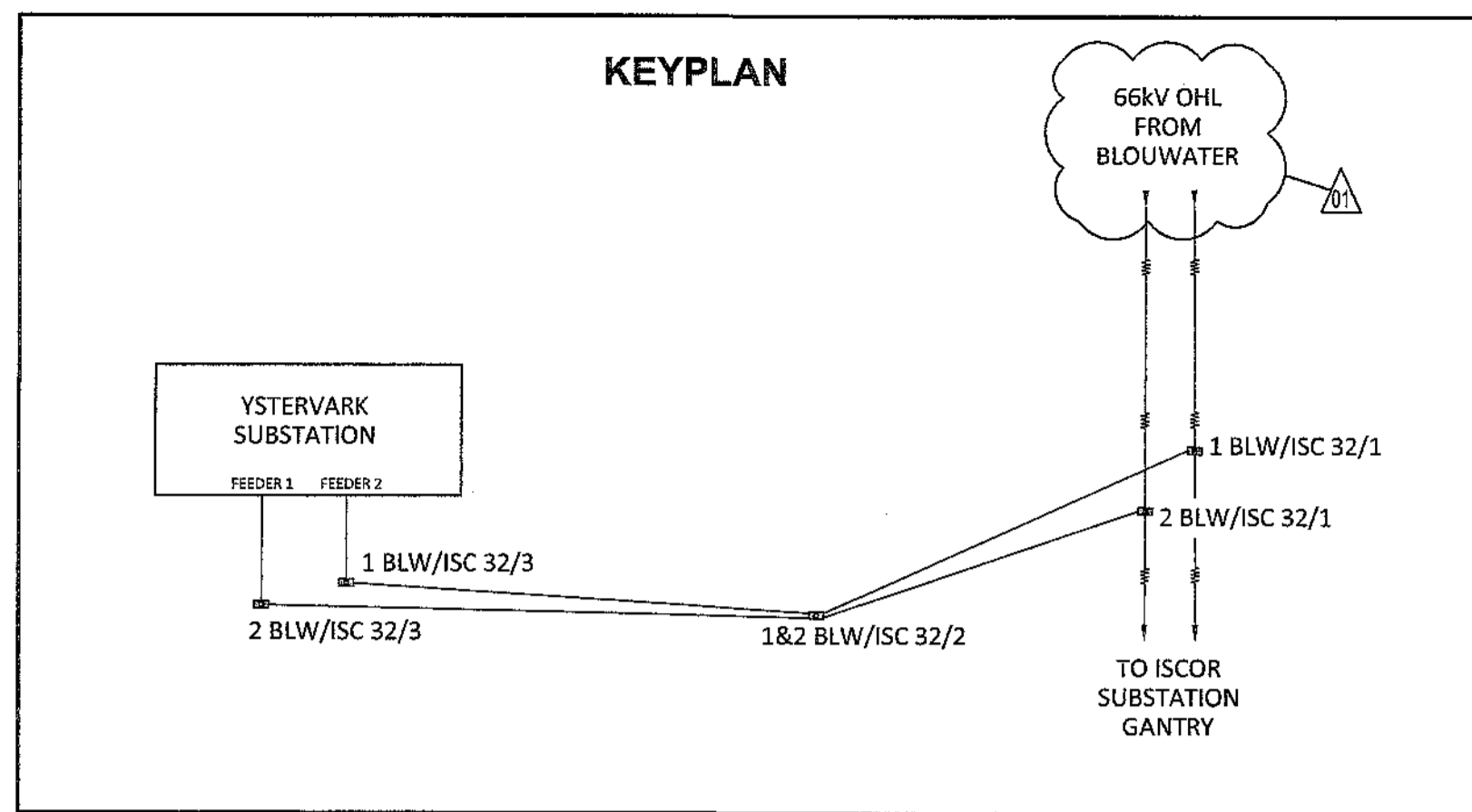
  

PROJECT NUMBER	ISS	FBS	DSE	TYPE	DRAWING NO.	SHEET	REV.	ID
19 24 7 0 1	2	3	0	E	DE	0030	01	00 AE

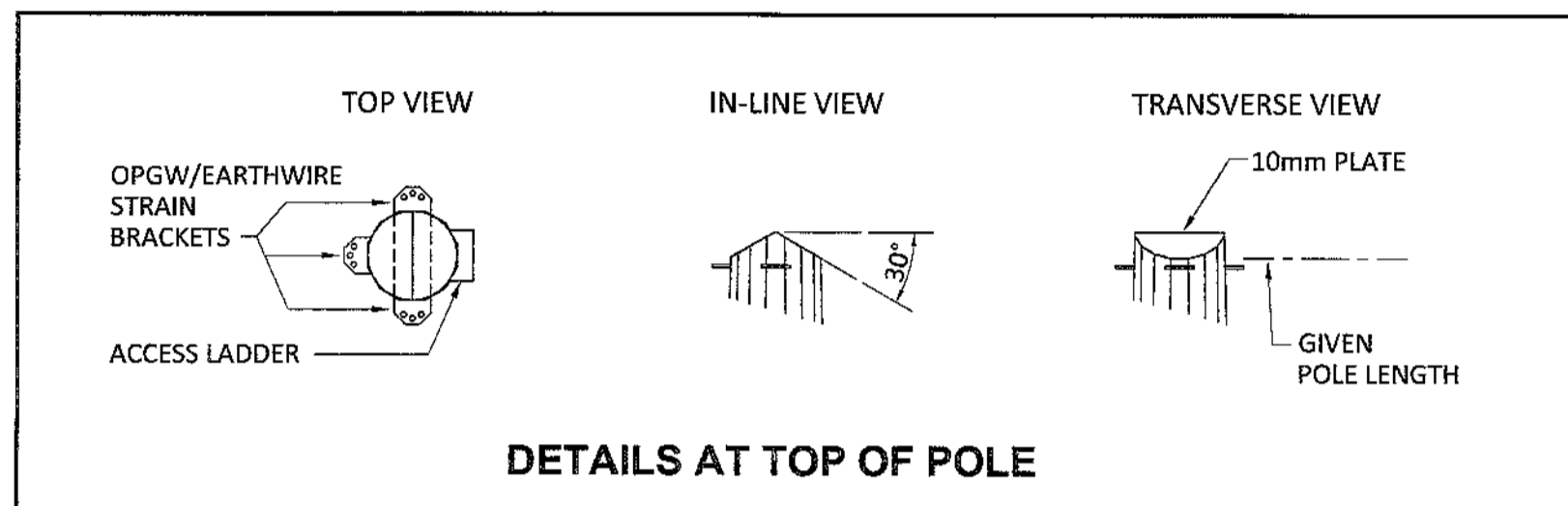




A



B



C

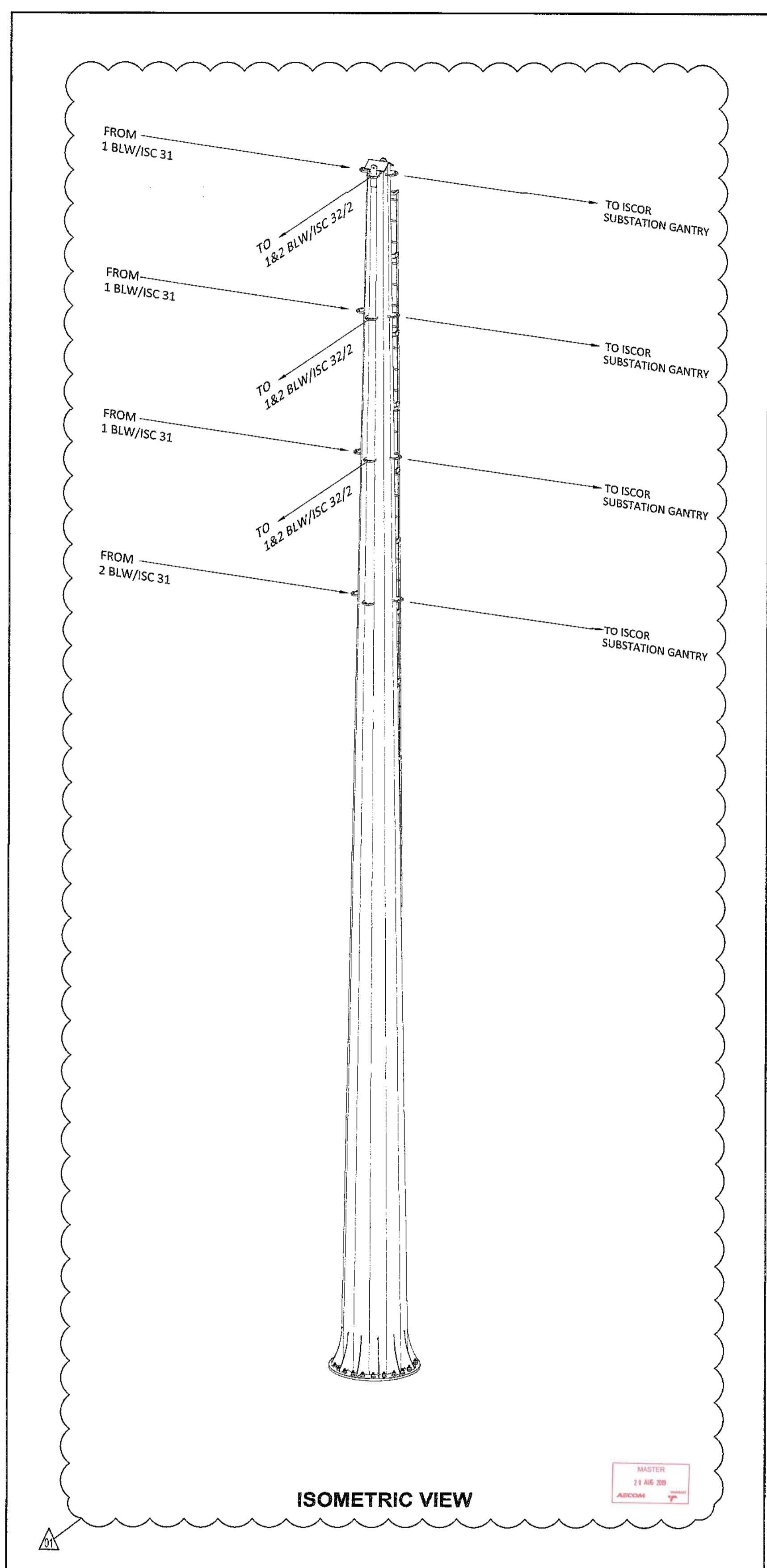
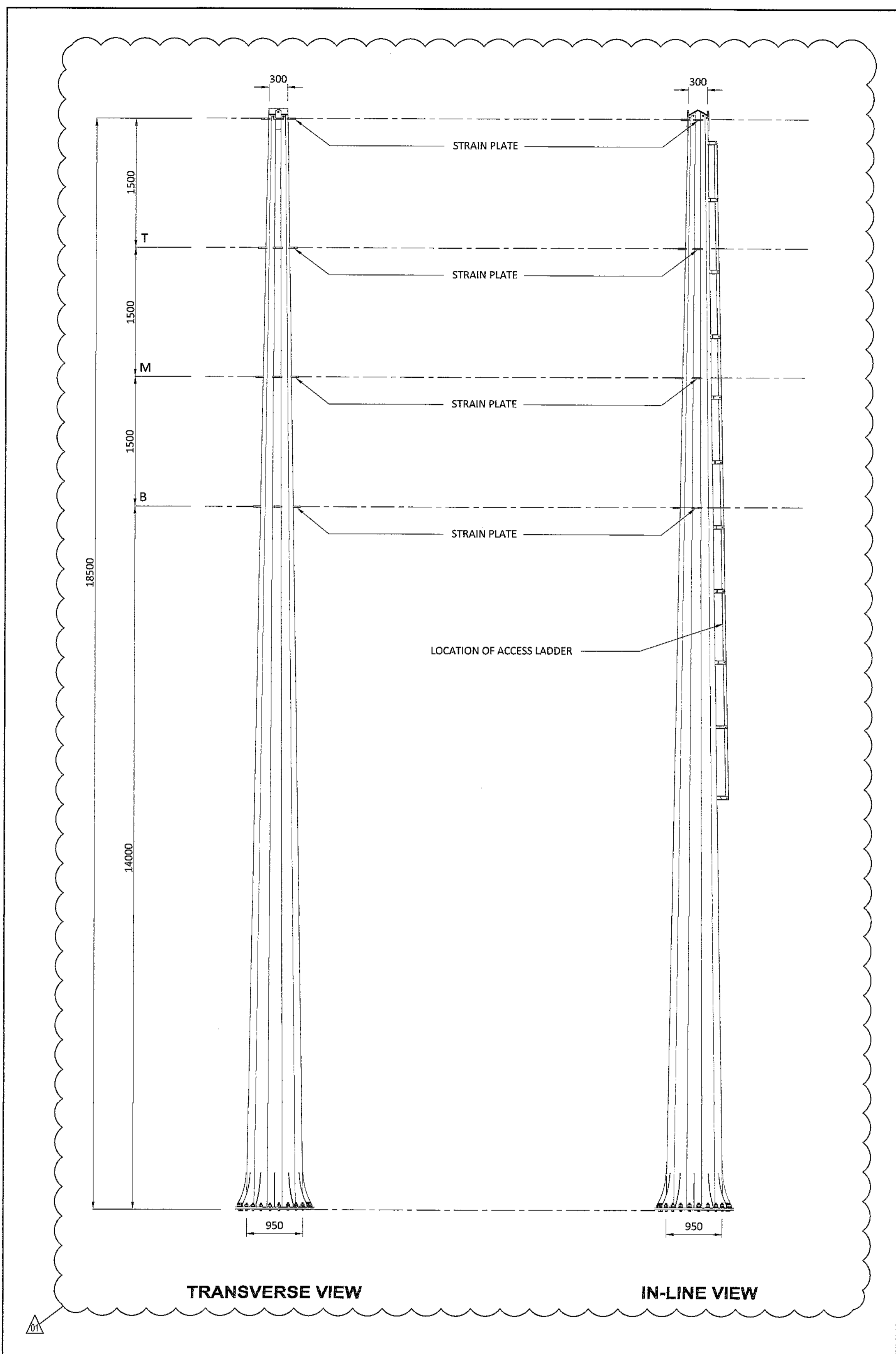
**SINGLE CIRCUIT T-OFF STRUCTURE, 14m CAH**

MAST NUMBER	1 BLW/ISC 32/1
PHASE CONDUCTOR : TYPE 1	CHICADEE ACSR
OPGW CONDUCTOR	EXISTING OPGW
SHIELD CONDUCTOR	OAK AAAC
VERTICAL φ - φ SPACING (m)	1.50
VERTICAL ε - φ SPACING (m)	1.50
CONDUCTOR ATTACHMENT HEIGHT (m)	14
SIDES	12
APPROXIMATE TOTAL LENGTH (m)	18.5
TIP DIAMETER (mm)	300
BASE DIAMETER (mm)	950
WALL THICKNESS (mm)	8
BASE PLATE O.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE I.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE THICKNESS (mm)	MANUFACTURER TO CONFIRM
H.D. BOLTS (qty)	MANUFACTURER TO CONFIRM
H.D. BOLTS DIAMETER (mm)	MANUFACTURER TO CONFIRM
H.D. BOLT PCD (mm)	MANUFACTURER TO CONFIRM
WORKING TIP LOAD (kN)	67.3
BASE G.L. MOMENT (kNm)	1245
BASELINE ESKOM STANDARD FOUNDATION REF (kNm)	2000
APPROXIMATE MASS (tons)	2.66
APPROXIMATE MAST UTILISATION (%)	70

D

- ADDITIONAL NOTES:**
- THE DESIGN OF THESE STRUCTURES IS GENERALLY IN ACCORDANCE WITH ASCE STANDARD 48-11 DESIGN OF STEEL TRANSMISSION POLE STRUCTURES. MANUFACTURE AND INSTALLATION SHOULD ALSO MEET THE REQUIREMENT OF THE SAME PUBLICATION.
  - POLES WILL HAVE THE LOWEST NUMBER OF SLIP JOINTS IN CONFORMANCE WITH THE LIMITATION IMPOSED BY THE LENGTH OF THE GALVANIZING BATH. SLIP JOINTS LENGTH IS TO BE 1.5 TIMES LARGEST I.D. OF THE FEMALE SECTION.
  - FULL PENETRATION WELDS ARE TO BE USED ON:
    - ALL SECTIONS JOINED BY THE CIRCUMFERENTIAL WELDS.
    - ALL LONGITUDINAL WELDS WITHIN 75mm OF CIRCUMFERENTIAL WELDS OR IN THE FEMALE SECTION OF A SLIP JOINT.
  - ACCESS LADDERS ARE REQUIRED ON ALL STRUCTURES FROM APPROXIMATELY 6m ABOVE GROUND LEVEL.
  - FOR FURTHER INFORMATION, REFER TO RESPECTIVE ESKOM STANDARDS AND SPECIFICATIONS.
  - MATERIAL : S355JR STEEL.
  - WELDING TO BE 8mm CONTINUOUS SEAL TO SANS 10162, UNLESS REQUIRED OTHERWISE.
  - HOP DIP GALVANIZING TO SANS 121.
  - STRESS RELIEVING TO BE APPLIED IN ACCORDANCE WITH SANS 121 TOLERANCES:
    - ON DIMENSION 2mm
    - ON DRILLING CENTRE'S 2mm

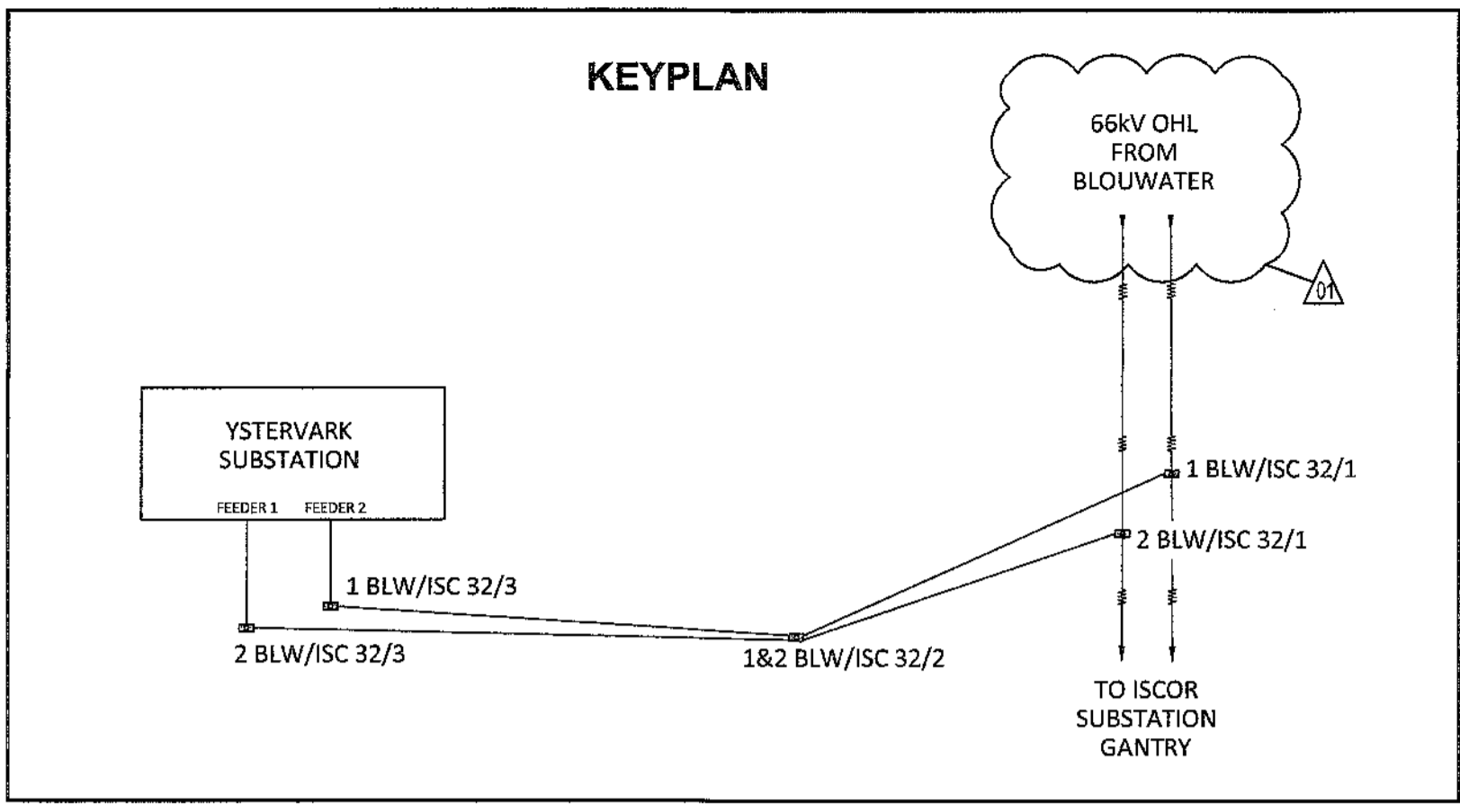
E



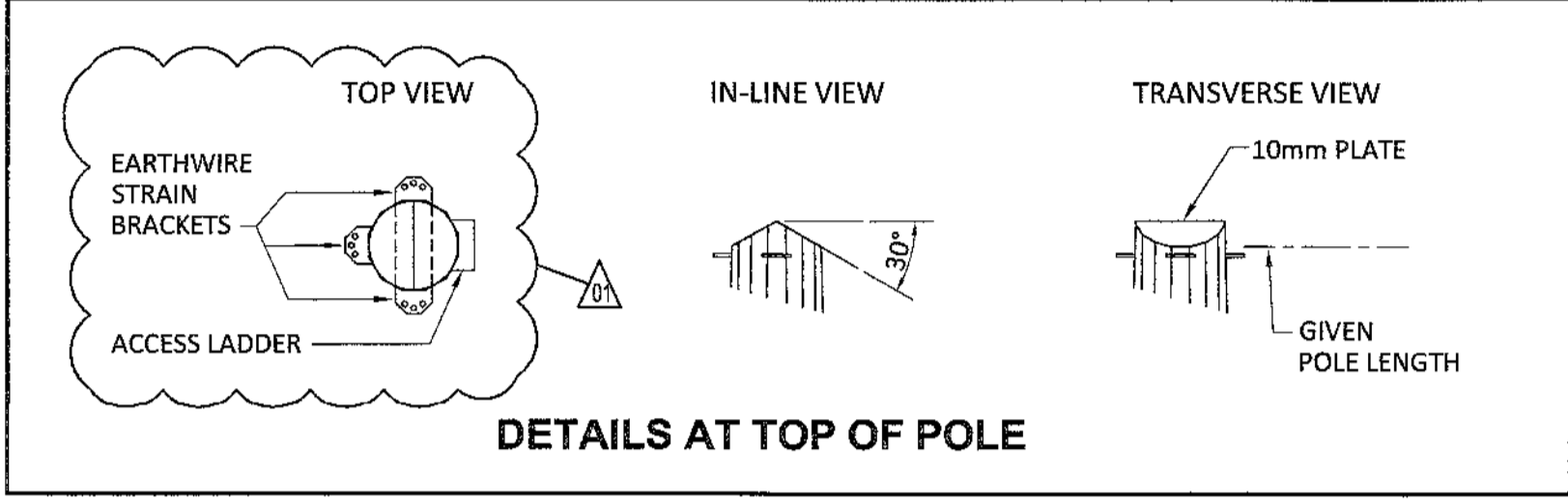
F

DRAWING NO.	REFERENCE	<p><b>NOTES</b></p> <ol style="list-style-type: none"> <li>DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.</li> <li>THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.</li> <li>THIS DRAWING DEPICTS THE DESIGN INTENT ONLY, NOT THE FINAL DESIGN</li> <li>THE MAST SHALL BE IN FULL COMPLIANCE WITH ESKOM WCOU, AND WHERE APPLICABLE, NATIONAL REQUIREMENTS.</li> <li>FOR FINAL DESIGN PURPOSES, THE CONTRACTOR SHALL ALSO CROSS REFERENCE THE DRAWING WITH THE WORKS INFORMATION, TECHNICAL SPECIFICATIONS, BOQ, ESKOM (FDP) FINAL DESIGN PACKAGE AND ANY OTHER ASSOCIATED CONTRACT DOCUMENTATION.</li> </ol>	<p><b>AECOM</b></p> <p>CAPE TOWN OFFICE WATERSIDE PLACE, SOUTH GATE TYGER WATERFRONT CARL CRONJÉ DRIVE TEL: +27 (0)21 950 7500 FAX: +27 (0)21 950 7502 REG. No. 1966/006628/07</p>	<p><b>CONTRACTOR / CONSULTANT</b></p> <table border="1"> <tr> <th>TITLE</th> <th>NAME</th> <th>SIGN</th> <th>DATE</th> </tr> <tr> <td>DRAWN</td> <td>DEM</td> <td>[Signature]</td> <td>19 08 19</td> </tr> <tr> <td>CHECKED</td> <td>DC</td> <td>[Signature]</td> <td>19 08 19</td> </tr> <tr> <td>DESIGNED</td> <td>NM</td> <td>[Signature]</td> <td>19 08 19</td> </tr> <tr> <td>CHECKED</td> <td>BS</td> <td>[Signature]</td> <td>19 08 19</td> </tr> </table>	TITLE	NAME	SIGN	DATE	DRAWN	DEM	[Signature]	19 08 19	CHECKED	DC	[Signature]	19 08 19	DESIGNED	NM	[Signature]	19 08 19	CHECKED	BS	[Signature]	19 08 19	<p><b>TRANSNET CAPITAL PROJECTS</b></p> <table border="1"> <tr> <th>TITLE</th> <th>NAME</th> <th>SIGN</th> <th>DATE</th> </tr> <tr> <td colspan="4">PR. ENG. / PR. TECH./PR. ARCH</td> </tr> <tr> <td>NAME</td> <td>CPYM</td> <td>DATE</td> <td></td> </tr> <tr> <td>SIGNATURE</td> <td>[Signature]</td> <td>19 08 19</td> <td></td> </tr> <tr> <td>REG. NUMBER</td> <td>2012/0126</td> <td></td> <td></td> </tr> <tr> <td>SCALE</td> <td>N.T.S.</td> <td></td> <td></td> </tr> </table>	TITLE	NAME	SIGN	DATE	PR. ENG. / PR. TECH./PR. ARCH				NAME	CPYM	DATE		SIGNATURE	[Signature]	19 08 19		REG. NUMBER	2012/0126			SCALE	N.T.S.			<p>Transnet Capital Projects</p> <p>TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) REG. NO. 19900090009 TABLE BAY BUILDING, TYGERBERG PARK, 163 UYS KRIGER DRIVE, PLATTEKLOOF, 8001 TEL: 021 940 1990 FAX: 086 677 2455</p> <p><b>PORT OF SALDANHA</b></p> <p>IRON ORE TIPLER 3 PROJECT BULK POWER UPGRADE : 66 KV BRANCH LINE MAST - T-OFF STRUCTURE (1 BLW/ISC 32/1)</p>	<table border="1"> <tr> <th>PROJECT NUMBER</th> <th>OD</th> <th>FBS</th> <th>DIS</th> <th>TYPE</th> <th>DRAWING NO.</th> <th>SHEET</th> <th>REV</th> <th>ID</th> </tr> <tr> <td>1924701</td> <td>2</td> <td>3</td> <td>0</td> <td>E</td> <td>0033</td> <td>01</td> <td>01</td> <td>AE</td> </tr> </table>	PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID	1924701	2	3	0	E	0033	01	01	AE
	TITLE				NAME	SIGN	DATE																																																														
DRAWN	DEM	[Signature]	19 08 19																																																																		
CHECKED	DC	[Signature]	19 08 19																																																																		
DESIGNED	NM	[Signature]	19 08 19																																																																		
CHECKED	BS	[Signature]	19 08 19																																																																		
TITLE	NAME	SIGN	DATE																																																																		
PR. ENG. / PR. TECH./PR. ARCH																																																																					
NAME	CPYM	DATE																																																																			
SIGNATURE	[Signature]	19 08 19																																																																			
REG. NUMBER	2012/0126																																																																				
SCALE	N.T.S.																																																																				
PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID																																																													
1924701	2	3	0	E	0033	01	01	AE																																																													
1	2	3	4	5	6	7	8																																																														

A



B



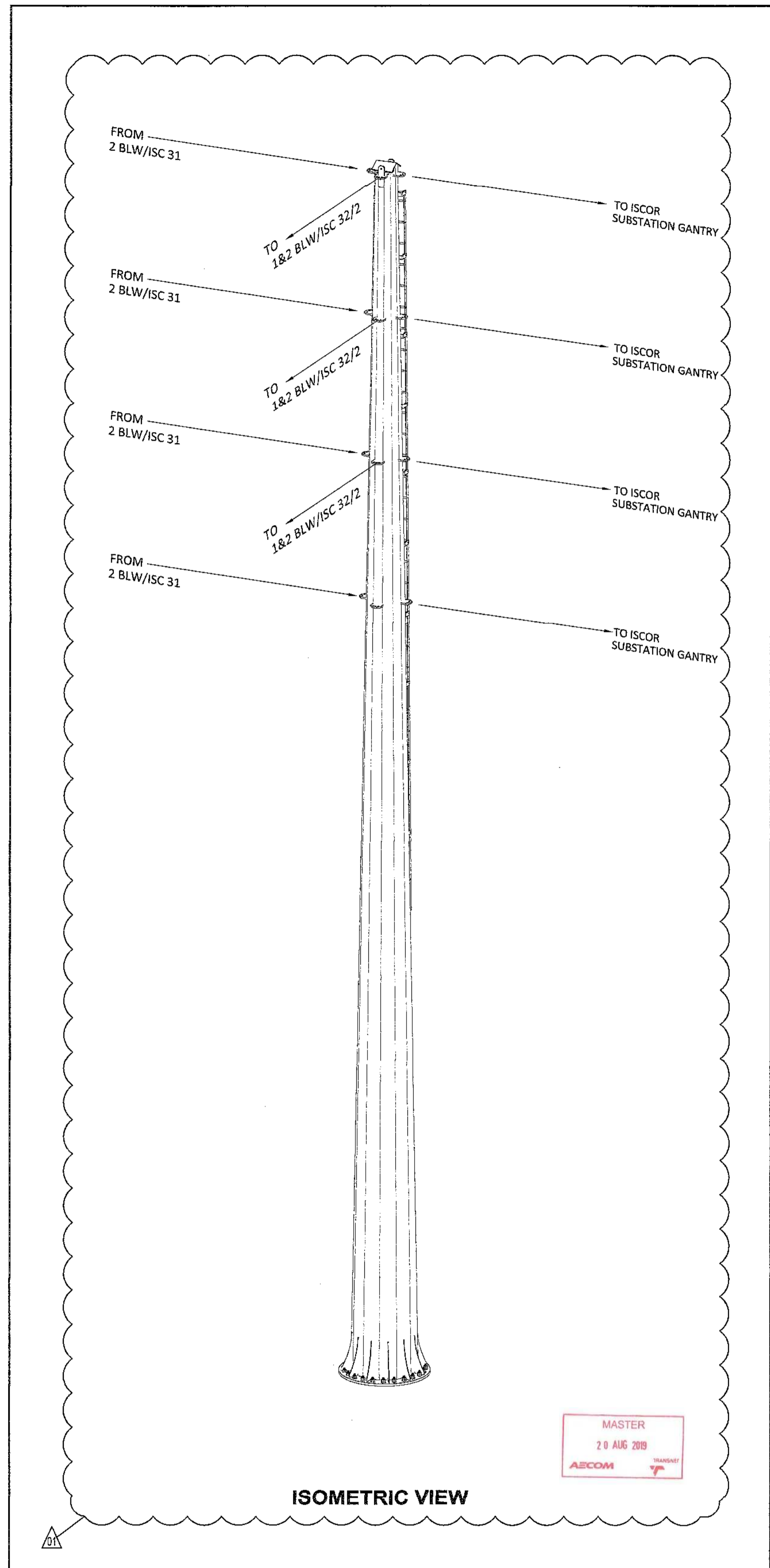
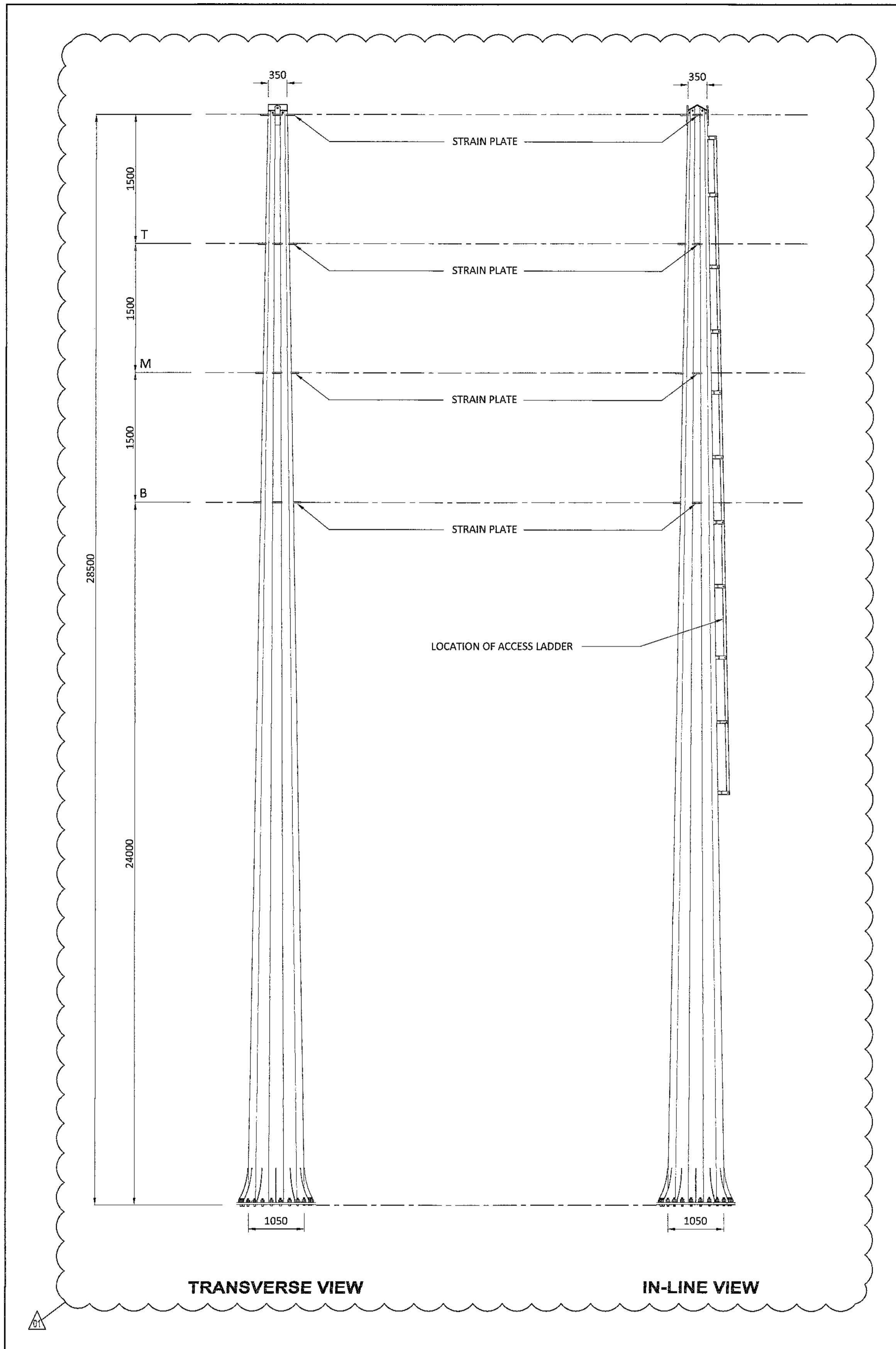
C

**SINGLE CIRCUIT T-OFF STRUCTURE, 24m CAH**

MAST NUMBER	2 BLW/ISC 32/1
PHASE CONDUCTOR : TYPE 1	CHICADEE ACSR
OPGW CONDUCTOR	NONE
SHIELD CONDUCTOR	OAK AAAC
VERTICAL $\phi - \phi$ SPACING (m)	1.50
VERTICAL E - $\phi$ SPACING (m)	1.50
CONDUCTOR ATTACHMENT HEIGHT (m)	24.00
SIDES	12
APPROXIMATE TOTAL LENGTH (m)	28.5
TIP DIAMETER (mm)	350
BASE DIAMETER (mm)	1050
WALL THICKNESS (mm)	10
BASE PLATE O.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE I.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE THICKNESS (mm)	MANUFACTURER TO CONFIRM
H.D. BOLTS (qty)	MANUFACTURER TO CONFIRM
H.D BOLTS DIAMETER (mm)	MANUFACTURER TO CONFIRM
H.D. BOLT PCD (mm)	MANUFACTURER TO CONFIRM
WORKING TIP LOAD (kN)	77.8
BASE G.L. MOMENT (kNm)	2217
BASELINE ESKOM STANDARD FOUNDATION REF (kNm)	3000
APPROXIMATE MASS (tons)	5.51
APPROXIMATE MAST UTILISATION (%)	86

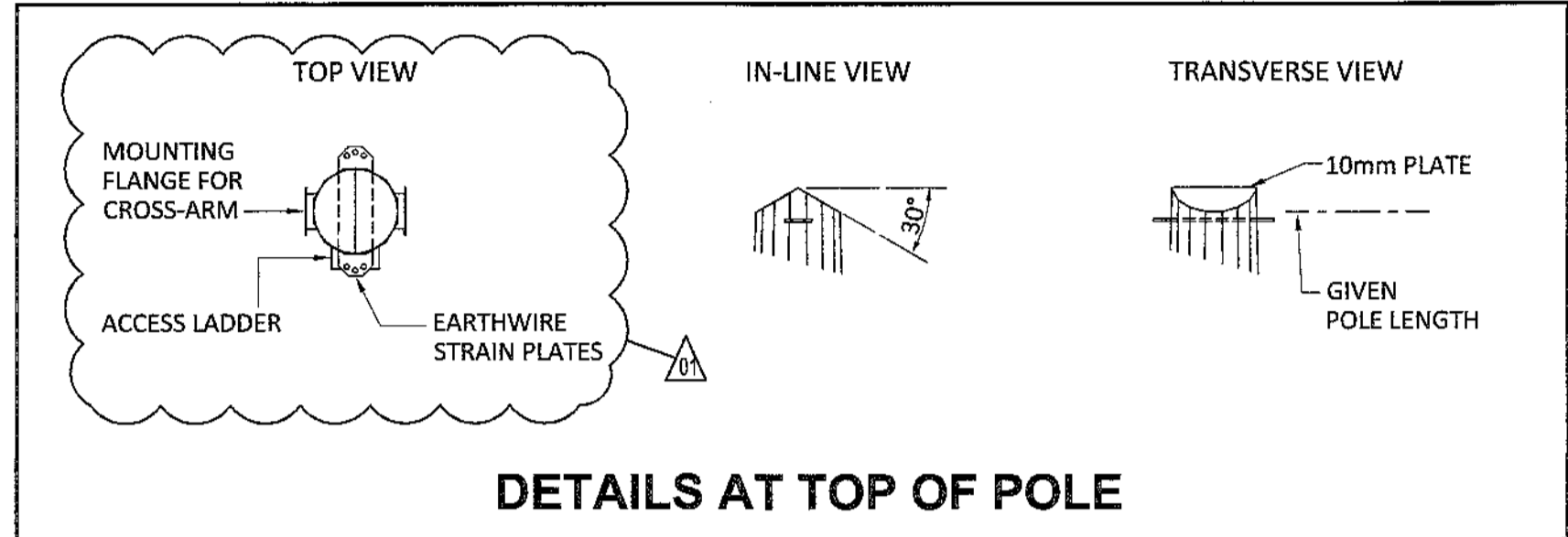
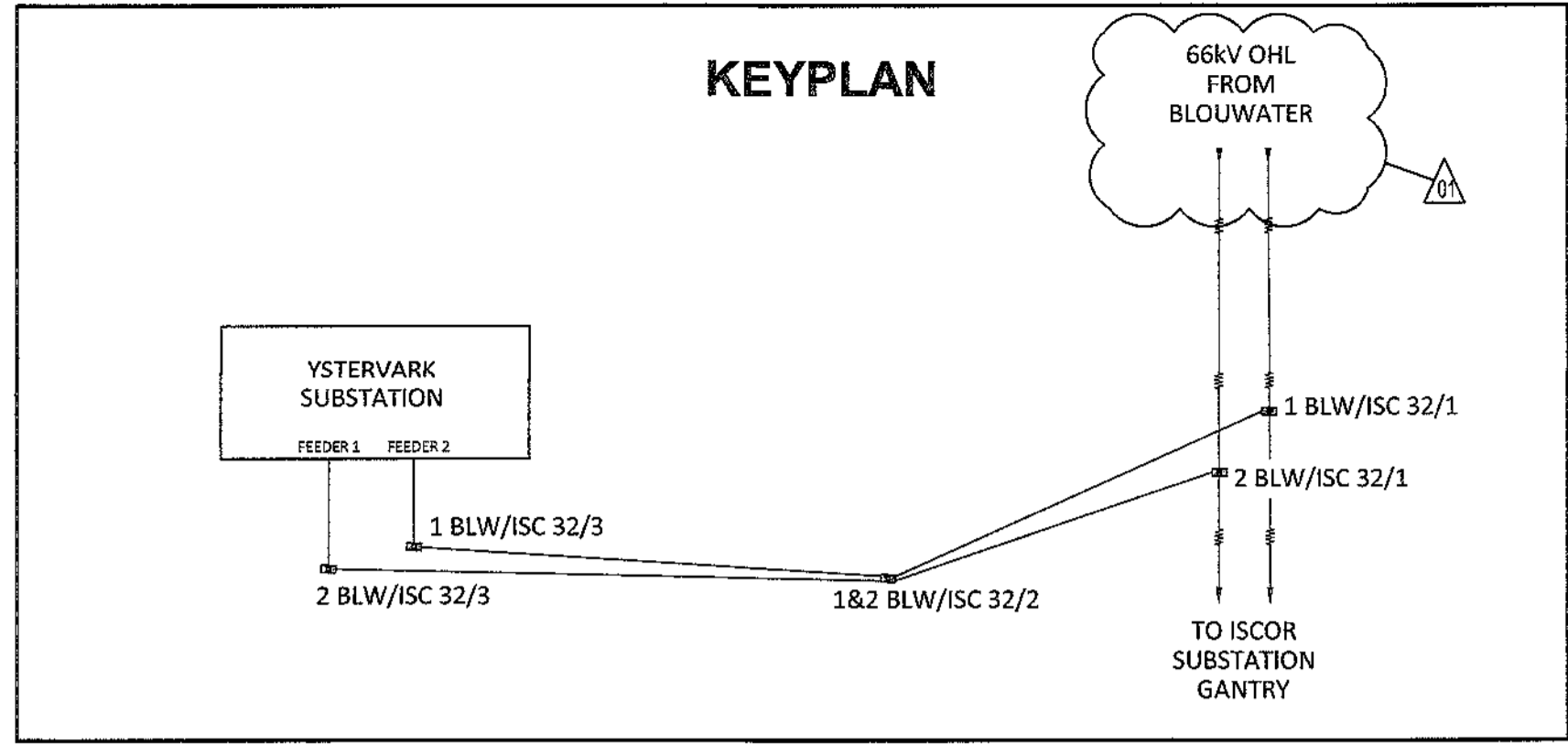
E

- ADDITIONAL NOTES:**
- THE DESIGN OF THESE STRUCTURES IS GENERALLY IN ACCORDANCE WITH ASCE STANDARD 48-11 DESIGN OF STEEL TRANSMISSION POLE STRUCTURES. MANUFACTURE AND INSTALLATION SHOULD ALSO MEET THE REQUIREMENT OF THE SAME PUBLICATION.
  - POLES WILL HAVE THE LOWEST NUMBER OF SLIP JOINTS IN CONFORMANCE WITH THE LIMITATION IMPOSED BY THE LENGTH OF THE GALVANIZING BATH. SLIP JOINTS LENGTH IS TO BE 1.5 TIMES LARGEST I.D. OF THE FEMALE SECTION.
  - FULL PENETRATION WELDS ARE TO BE USED ON:
    - ALL SECTIONS JOINED BY THE CIRCUMFERENTIAL WELDS.
    - ALL LONGITUDINAL WELDS WITHIN 75mm OF CIRCUMFERENTIAL WELDS OR IN THE FEMALE SECTION OF A SLIP JOINT.
  - ACCESS LADDERS ARE REQUIRED ON ALL STRUCTURES FROM APPROXIMATELY 6m ABOVE GROUND LEVEL.
  - FOR FURTHER INFORMATION, REFER TO RESPECTIVE ESKOM STANDARDS AND SPECIFICATIONS.
  - MATERIAL : S355JR STEEL
  - WELDING TO BE 8mm CONTINUOUS SEAL TO SANS 10162, UNLESS REQUIRED OTHERWISE.
  - HOP DIP GALVANIZING TO SANS 121.
  - STRESS RELIEVING TO BE APPLIED IN ACCORDANCE WITH SANS 121 TOLERANCES:
    - ON DIMENSION 2mm
    - ON DRILLING CENTRE'S 2mm



F

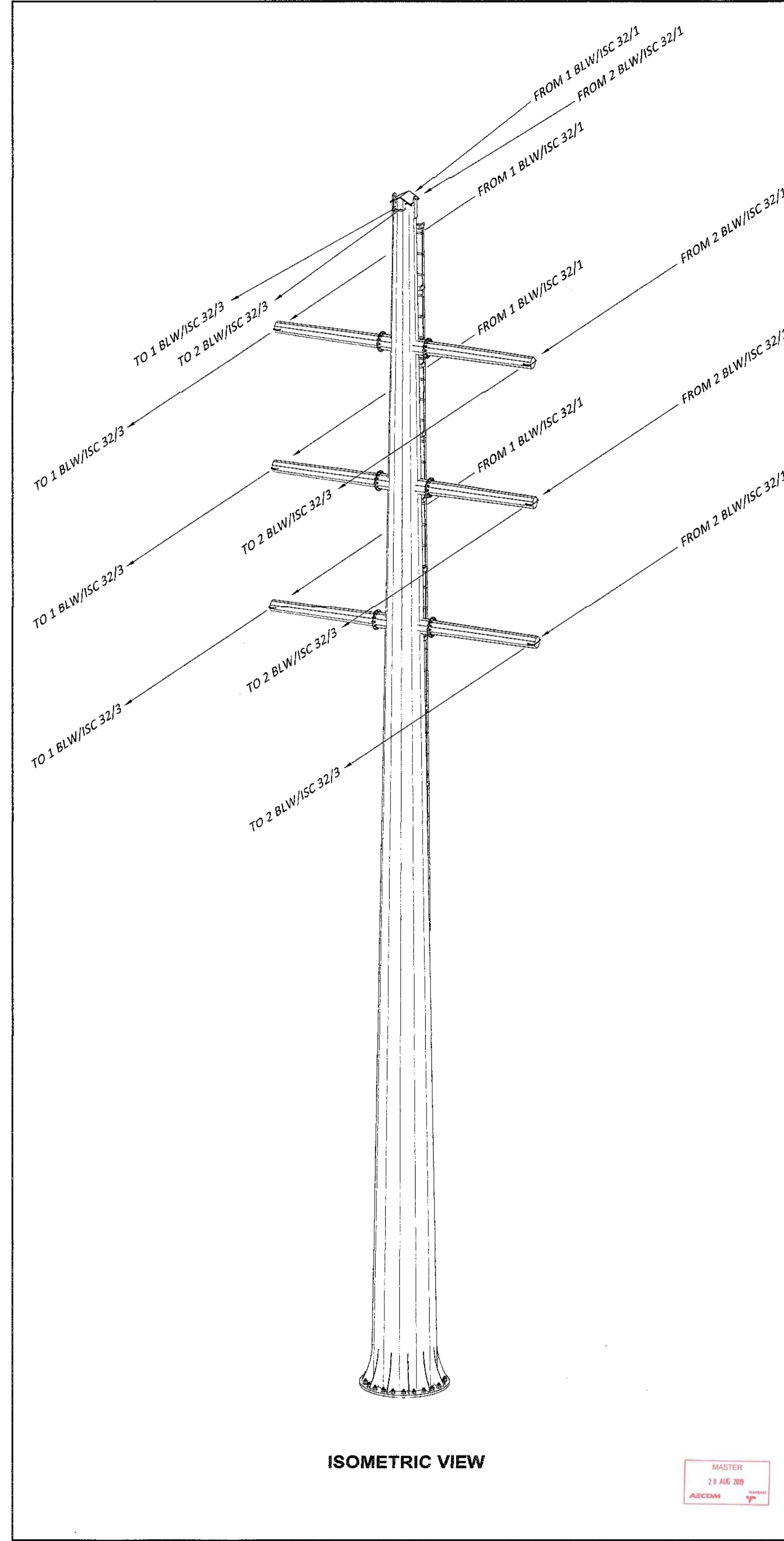
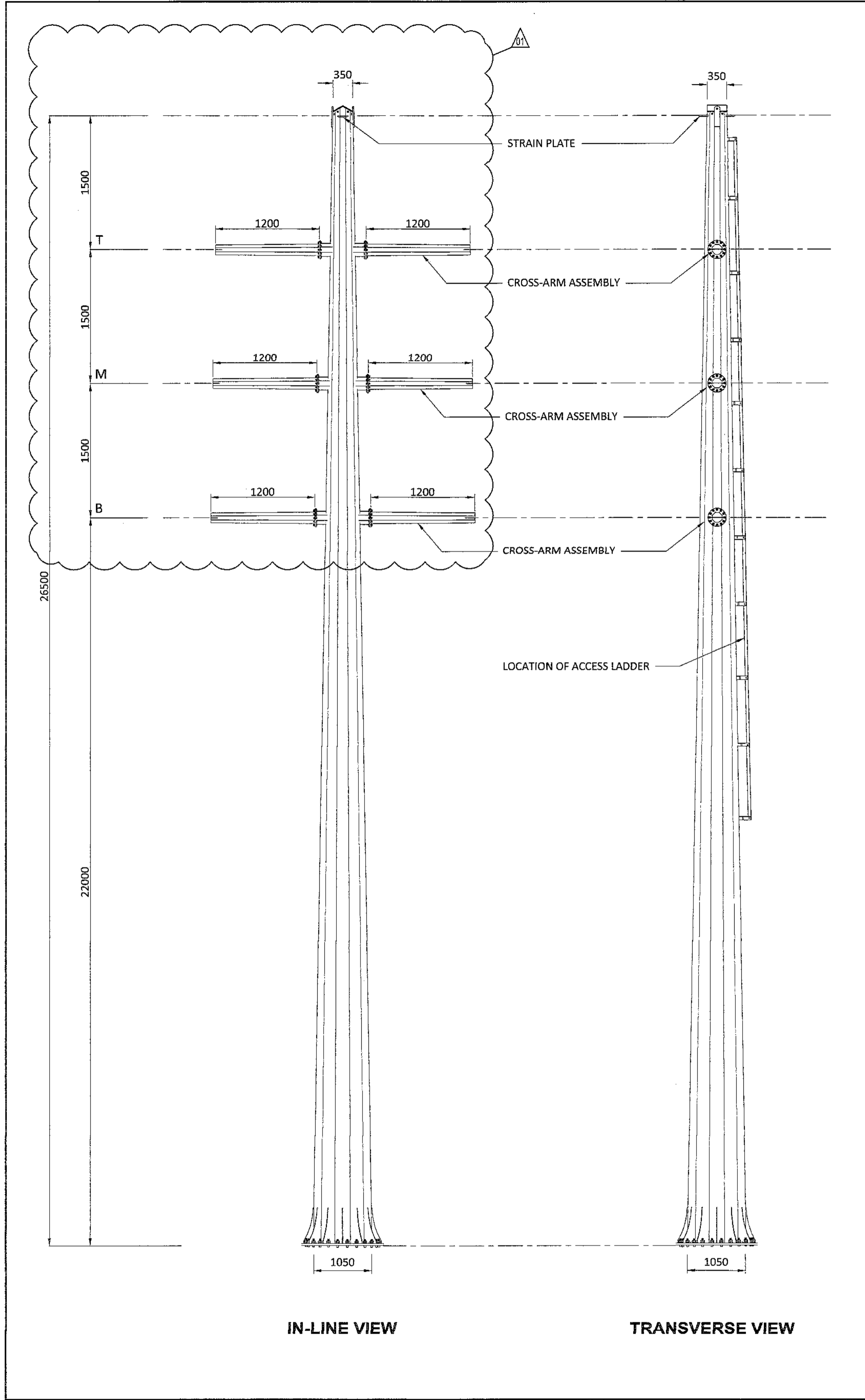
DRAWING NO.	REFERENCE	<p><b>NOTES</b></p> <ol style="list-style-type: none"> <li>DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.</li> <li>THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.</li> <li>THIS DRAWING DEPICTS THE DESIGN INTENT ONLY, NOT THE FINAL DESIGN</li> <li>THE MAST SHALL BE IN FULL COMPLIANCE WITH ESKOM WCOU, AND WHERE APPLICABLE, NATIONAL REQUIREMENTS.</li> <li>FOR FINAL DESIGN PURPOSES, THE CONTRACTOR SHALL ALSO CROSS REFERENCE THE DRAWING WITH THE WORKS INFORMATION, TECHNICAL SPECIFICATIONS, BOQ, ESKOM (FDP) FINAL DESIGN PACKAGE AND ANY OTHER ASSOCIATED CONTRACT DOCUMENTATION.</li> </ol>	<p><b>AECOM</b></p> <p>CAPE TOWN OFFICE WATERSIDE PLACE, SOUTH GATE TYGER WATERFRONT CARL CRONJÉ DRIVE TEL: +27 (0)21 950 7500 FAX: +27 (0)21 950 7502 REG. No. 1966/006628/07</p>	<p><b>CONTRACTOR / CONSULTANT</b></p> <table border="1"> <tr><th>TITLE</th><th>NAME</th><th>SIGN</th><th>DATE</th></tr> <tr><td>DRAWN</td><td>DEM</td><td>[Signature]</td><td>19 08 19</td></tr> <tr><td>CHECKED</td><td>DC</td><td>[Signature]</td><td>19 08 19</td></tr> <tr><td>DESIGNED</td><td>NM</td><td>[Signature]</td><td>19 08 19</td></tr> <tr><td>CHECKED</td><td>BS</td><td>[Signature]</td><td>19 08 19</td></tr> </table>	TITLE	NAME	SIGN	DATE	DRAWN	DEM	[Signature]	19 08 19	CHECKED	DC	[Signature]	19 08 19	DESIGNED	NM	[Signature]	19 08 19	CHECKED	BS	[Signature]	19 08 19	<p><b>TRANSNET CAPITAL PROJECTS</b></p> <table border="1"> <tr><th>TITLE</th><th>NAME</th><th>SIGN</th><th>DATE</th></tr> <tr><td>PR.ENG. / PR.TECH./PR. ARCH</td><td>[Signature]</td><td>[Signature]</td><td>19 08 19</td></tr> <tr><td>REG. NUMBER</td><td>201270126</td><td></td><td></td></tr> <tr><td>SCALE</td><td>N.T.S.</td><td></td><td></td></tr> </table>	TITLE	NAME	SIGN	DATE	PR.ENG. / PR.TECH./PR. ARCH	[Signature]	[Signature]	19 08 19	REG. NUMBER	201270126			SCALE	N.T.S.			<p>Transnet Capital Projects</p> <p>TRANSNET LTD. (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 19900000506 TABLE BAY BUILDING, TYGERBERG PARK, 163 LYS KRIGER DRIVE, PLATTEKLOOF, 8001 TEL: 021 940 1999 FAX: 086 077 2455</p> <p><b>PORT OF SALDANHA</b></p> <p>IRON ORE TIPLER 3 PROJECT BULK POWER UPGRADE : 66 kV BRANCH LINE MAST - T-OFF STRUCTURE (2 BLW/ISC 32/1)</p>
	TITLE				NAME	SIGN	DATE																																			
DRAWN	DEM	[Signature]	19 08 19																																							
CHECKED	DC	[Signature]	19 08 19																																							
DESIGNED	NM	[Signature]	19 08 19																																							
CHECKED	BS	[Signature]	19 08 19																																							
TITLE	NAME	SIGN	DATE																																							
PR.ENG. / PR.TECH./PR. ARCH	[Signature]	[Signature]	19 08 19																																							
REG. NUMBER	201270126																																									
SCALE	N.T.S.																																									
REFERENCE DRAWINGS	<p><b>REVISIONS</b></p> <table border="1"> <tr><th>NO.</th><th>DESCRIPTION</th><th>BY</th><th>CHKD</th><th>APPD</th><th>DATE</th></tr> <tr><td>01</td><td>ISSUED FOR CONSTRUCTION. CHANGED TO 24m CAH. POLE DATA REVISED. REFER TO REV CLOUDS ON DRAWING</td><td>DEM</td><td>BS</td><td>CP</td><td>2019-08-19</td></tr> <tr><td>00</td><td>ISSUED FOR CONSTRUCTION</td><td>DEM</td><td>BS</td><td>CP</td><td>2018-05-11</td></tr> </table> <p>This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.</p>	NO.	DESCRIPTION	BY	CHKD	APPD	DATE	01	ISSUED FOR CONSTRUCTION. CHANGED TO 24m CAH. POLE DATA REVISED. REFER TO REV CLOUDS ON DRAWING	DEM	BS	CP	2019-08-19	00	ISSUED FOR CONSTRUCTION	DEM	BS	CP	2018-05-11	<table border="1"> <tr><th>PROJECT NUMBER</th><th>OD</th><th>FBS</th><th>DIS</th><th>TYPE</th><th>DRAWING NO.</th><th>SHEET</th><th>REV</th><th>ID</th></tr> <tr><td>1924701</td><td>2</td><td>3</td><td>0</td><td>E</td><td>DE-0034</td><td>01</td><td>01</td><td>AE</td></tr> </table>	PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID	1924701	2	3	0	E	DE-0034	01	01	AE				
NO.	DESCRIPTION	BY	CHKD	APPD	DATE																																					
01	ISSUED FOR CONSTRUCTION. CHANGED TO 24m CAH. POLE DATA REVISED. REFER TO REV CLOUDS ON DRAWING	DEM	BS	CP	2019-08-19																																					
00	ISSUED FOR CONSTRUCTION	DEM	BS	CP	2018-05-11																																					
PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID																																		
1924701	2	3	0	E	DE-0034	01	01	AE																																		



### DOUBLE CIRCUIT STRAIN STRUCTURE, 22m CAH

MAST NUMBER	1 & 2 BLW/ISC 32/2
PHASE CONDUCTOR : TYPE 1	CHICADEE ACSR
OPGW CONDUCTOR	NONE
SHIELD CONDUCTOR	OAK AAAC
VERTICAL $\phi$ - $\phi$ SPACING (m)	1.50
VERTICAL $\epsilon$ - $\phi$ SPACING (m)	1.50
CONDUCTOR ATTACHMENT HEIGHT (m)	22
SIDES	12
APPROXIMATE TOTAL LENGTH (m)	26.5
TIP DIAMETER (mm)	350
BASE DIAMETER (mm)	1050
WALL THICKNESS (mm)	10
BASE PLATE O.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE I.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE THICKNESS (mm)	MANUFACTURER TO CONFIRM
H.D. BOLTS (qty)	MANUFACTURER TO CONFIRM
H.D BOLTS DIAMETER (mm)	MANUFACTURER TO CONFIRM
H.D. BOLT PCD (mm)	MANUFACTURER TO CONFIRM
WORKING TIP LOAD (kN)	84.1
BASE G.L. MOMENT (kNm)	2229.3
BASELINE ESKOM STANDARD FOUNDATION REF (kNm)	3000
APPROXIMATE MASS (tons)	5.51
APPROXIMATE MAST UTILISATION (%)	84

- ### ADDITIONAL NOTES:
- THE DESIGN OF THESE STRUCTURES IS GENERALLY IN ACCORDANCE WITH ASCE STANDARD 48-11 DESIGN OF STEEL TRANSMISSION POLE STRUCTURES. MANUFACTURE AND INSTALLATION SHOULD ALSO MEET THE REQUIREMENT OF THE SAME PUBLICATION.
  - POLES WILL HAVE THE LOWEST NUMBER OF SLIP JOINTS IN CONFORMANCE WITH THE LIMITATION IMPOSED BY THE LENGTH OF THE GALVANIZING BATH. SLIP JOINTS LENGTH IS TO BE 1.5 TIMES LARGEST I.D. OF THE FEMALE SECTION.
  - FULL PENETRATION WELDS ARE TO BE USED ON:
    - ALL SECTIONS JOINED BY THE CIRCUMFERENTIAL WELDS.
    - ALL LONGITUDINAL WELDS WITHIN 75mm OF CIRCUMFERENTIAL WELDS OR IN THE FEMALE SECTION OF A SLIP JOINT.
  - ACCESS LADDERS ARE REQUIRED ON ALL STRUCTURES FROM APPROXIMATELY 6m ABOVE GROUND LEVEL.
  - FOR FURTHER INFORMATION, REFER TO RESPECTIVE ESKOM STANDARDS AND SPECIFICATIONS.
  - MATERIAL : S355JR STEEL.
  - WELDING TO BE 8mm CONTINUOUS SEAL TO SANS 10162, UNLESS REQUIRED OTHERWISE.
  - HOP DIP GALVANIZING TO SANS 121.
  - STRESS RELIEVING TO BE APPLIED IN ACCORDANCE WITH SANS 121 TOLERANCES:
    - ON DIMENSION 2mm
    - ON DRILLING CENTRE'S 2mm



- ### NOTES
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - THIS DRAWING DEPICTS THE DESIGN INTENT ONLY, NOT THE FINAL DESIGN
  - THE MAST SHALL BE IN FULL COMPLIANCE WITH ESKOM WCOU, AND WHERE APPLICABLE, NATIONAL REQUIREMENTS.
  - FOR FINAL DESIGN PURPOSES, THE CONTRACTOR SHALL ALSO CROSS REFERENCE THE DRAWING WITH THE WORKS INFORMATION, TECHNICAL SPECIFICATIONS, BOQ, ESKOM (FDP) FINAL DESIGN PACKAGE AND ANY OTHER ASSOCIATED CONTRACT DOCUMENTATION.

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJÉ DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

### REVISIONS

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION. OPGW OMITTED AND POLE DATA REVISED. REFER TO REV CLOUDS ON DRAWING	DEM	BS	CP	2019-08-19
00	ISSUED FOR CONSTRUCTION	DEM	BS	CP	2018-05-11

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DEM	[Signature]	19 08 19				
CHECKED	DC	[Signature]	19 08 19				
DESIGNED	NM	[Signature]	19 08 19				
CHECKED	BS	[Signature]	19 08 19				

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

PR.ENG. / PR.TECH./PR. ARCH			
NAME	CPYM	DATE	

REG. NUMBER	DATE
231270126	19 08 19

SCALE: N.T.S.

Transnet Capital Projects

TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 199000300000  
TABLE BAY BUILDING, TYGERBERG PARK,  
163 LYS KRIGE DRIVE, PLATTEKLOOF.  
8001 TEL: 021 940 1999  
FAX: 086 677 2495

### PORT OF SALDANHA

### IRON ORE TIPLER 3 PROJECT

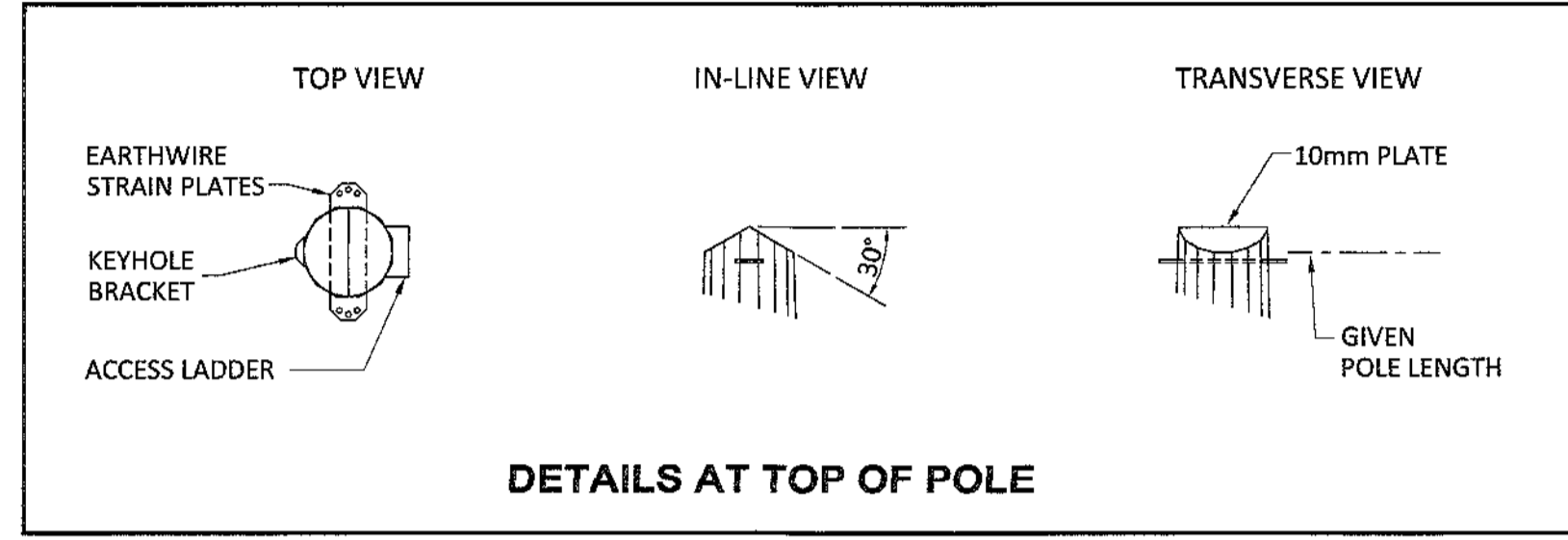
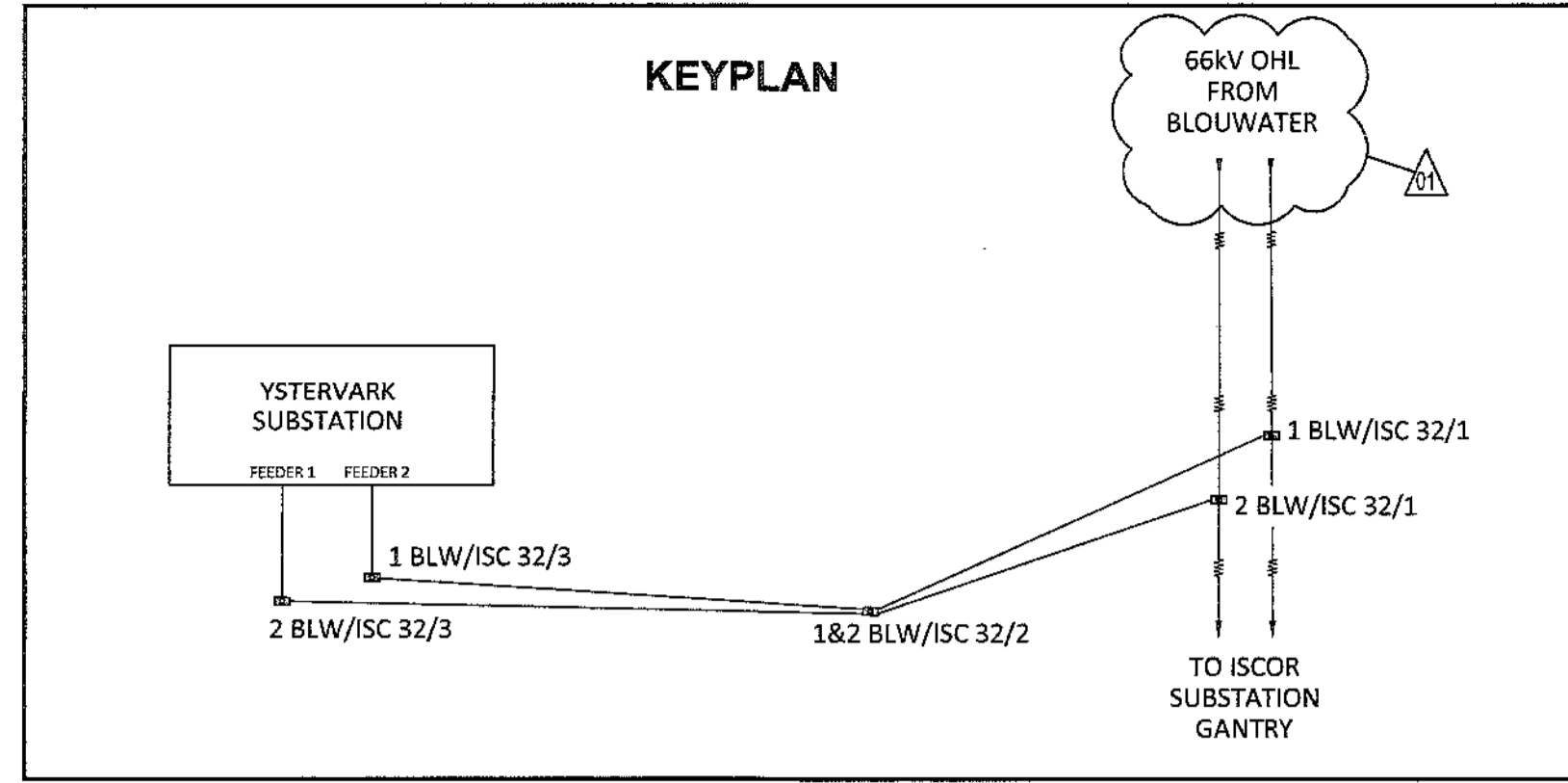
### BULK POWER LINE UPGRADE :

### 66 kV STRANCH LINE MAST -

### STRAIN STRUCTURE (1 & 2 BLW/ISC 32/2)

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	3	0	E	0035	01	01	AE

DRAWING NO.	REFERENCE

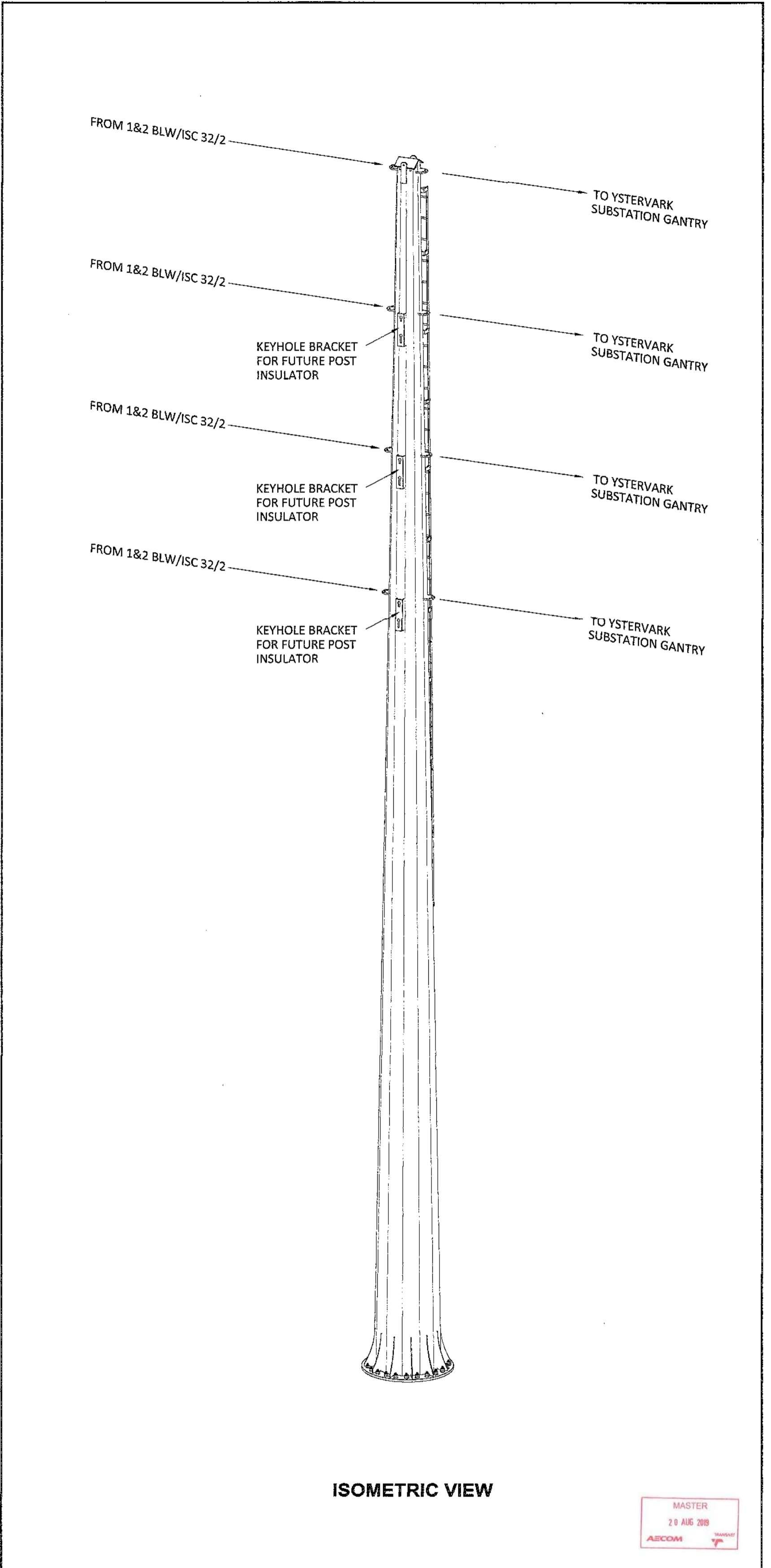
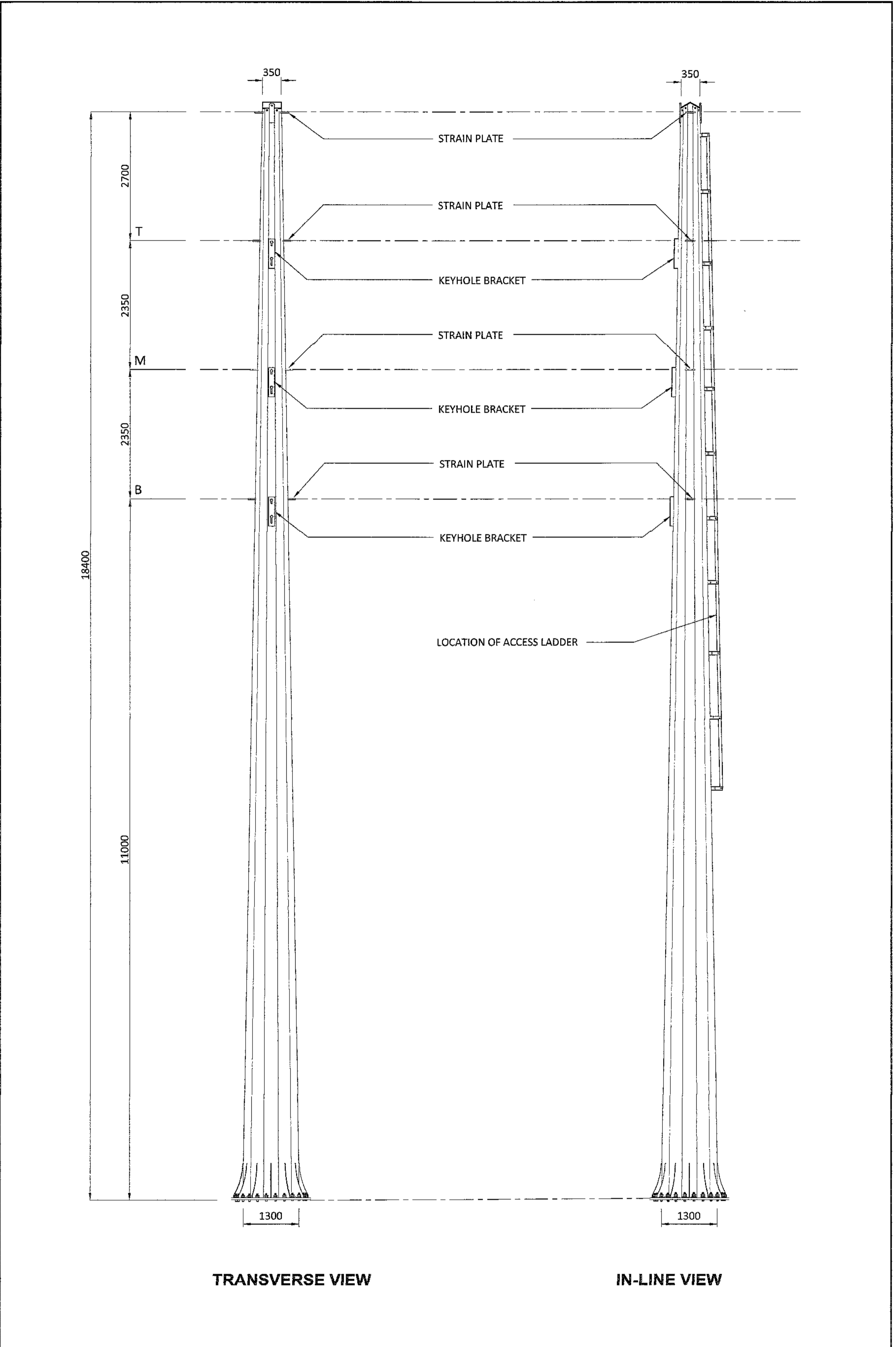


### SINGLE CIRCUIT TERMINAL STRUCTURE, 11m CAH

MAST NUMBER	1 BLW/ISC 32/3
PHASE CONDUCTOR : TYPE 1	CHICADEE ACSR
PHASE CONDUCTOR : TYPE 2	KINGBIRD ACSR (CLOSING SPAN)
OPGW CONDUCTOR	NONE
SHIELD CONDUCTOR	OAK AAAC
VERTICAL $\phi - \phi$ SPACING (m)	2.35
VERTICAL $\epsilon - \phi$ SPACING (m)	2.7
CONDUCTOR ATTACHMENT HEIGHT (m)	11
SIDES	16
APPROXIMATE TOTAL LENGTH (m)	18.4
TIP DIAMETER (mm)	350
BASE DIAMETER (mm)	1300
WALL THICKNESS (mm)	12
BASE PLATE O.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE I.D (mm)	MANUFACTURER TO CONFIRM
BASE PLATE THICKNESS (mm)	MANUFACTURER TO CONFIRM
H.D. BOLTS (qty)	MANUFACTURER TO CONFIRM
H.D BOLTS DIAMETER (mm)	MANUFACTURER TO CONFIRM
H.D. BOLT PCD (mm)	MANUFACTURER TO CONFIRM
WORKING TIP LOAD (kN)	210.16
BASE G.L MOMENT (kNm)	3867
BASELINE ESKOM STANDARD FOUNDATION REF (kNm)	4500
APPROXIMATE MASS (tons)	4.70
APPROXIMATE MAST UTILISATION (%)	21.7 (INITIAL)

### ADDITIONAL NOTES:

- THE DESIGN OF THESE STRUCTURES IS GENERALLY IN ACCORDANCE WITH ASCE STANDARD 48-11 DESIGN OF STEEL TRANSMISSION POLE STRUCTURES. MANUFACTURE AND INSTALLATION SHOULD ALSO MEET THE REQUIREMENT OF THE SAME PUBLICATION.
- POLES WILL HAVE THE LOWEST NUMBER OF SLIP JOINTS IN CONFORMANCE WITH THE LIMITATION IMPOSED BY THE LENGTH OF THE GALVANIZING BATH. SLIP JOINTS LENGTH IS TO BE 1.5 TIMES LARGEST I.D. OF THE FEMALE SECTION.
- FULL PENETRATION WELDS ARE TO BE USED ON:
  - ALL SECTIONS JOINED BY THE CIRCUMFERENTIAL WELDS.
  - ALL LONGITUDINAL WELDS WITHIN 75mm OF CIRCUMFERENTIAL WELDS OR IN THE FEMALE SECTION OF A SLIP JOINT.
- ACCESS LADDERS ARE REQUIRED ON ALL STRUCTURES FROM APPROXIMATELY 6m ABOVE GROUND LEVEL.
- FOR FURTHER INFORMATION, REFER TO RESPECTIVE ESKOM STANDARDS AND SPECIFICATIONS.
- MATERIAL : S355JR STEEL.
- WELDING TO BE 8mm CONTINUOUS SEAL TO SANS 10162, UNLESS REQUIRED OTHERWISE.
- HOP DIP GALVANIZING TO SANS 121.
- STRESS RELIEVING TO BE APPLIED IN ACCORDANCE WITH SANS 121 TOLERANCES:
  - ON DIMENSION 2mm
  - ON DRILLING CENTRE'S 2mm



DRAWING NO.	REFERENCE
	REFERENCE DRAWINGS

### NOTES

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- THIS DRAWING DEPICTS THE DESIGN INTENT ONLY, NOT THE FINAL DESIGN
- THE MAST SHALL BE IN FULL COMPLIANCE WITH ESKOM WCOU, AND WHERE APPLICABLE, NATIONAL REQUIREMENTS.
- FOR FINAL DESIGN PURPOSES, THE CONTRACTOR SHALL ALSO CROSS REFERENCE THE DRAWING WITH THE WORKS INFORMATION, TECHNICAL SPECIFICATIONS, BOQ, ESKOM (FDP) FINAL DESIGN PACKAGE AND ANY OTHER ASSOCIATED CONTRACT DOCUMENTATION.

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJÉ DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION. REFER TO REV CLOUDS	DEM	BS	CP	2019-08-19
02	ISSUED FOR CONSTRUCTION	DEM	BS	CP	2018-05-11

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DEM	[Signature]	'19 08 19				
CHECKED	DC	[Signature]	'19 08 19				
DESIGNED	NM	[Signature]	'19 08 19				
CHECKED	BS	[Signature]	'19 08 19				

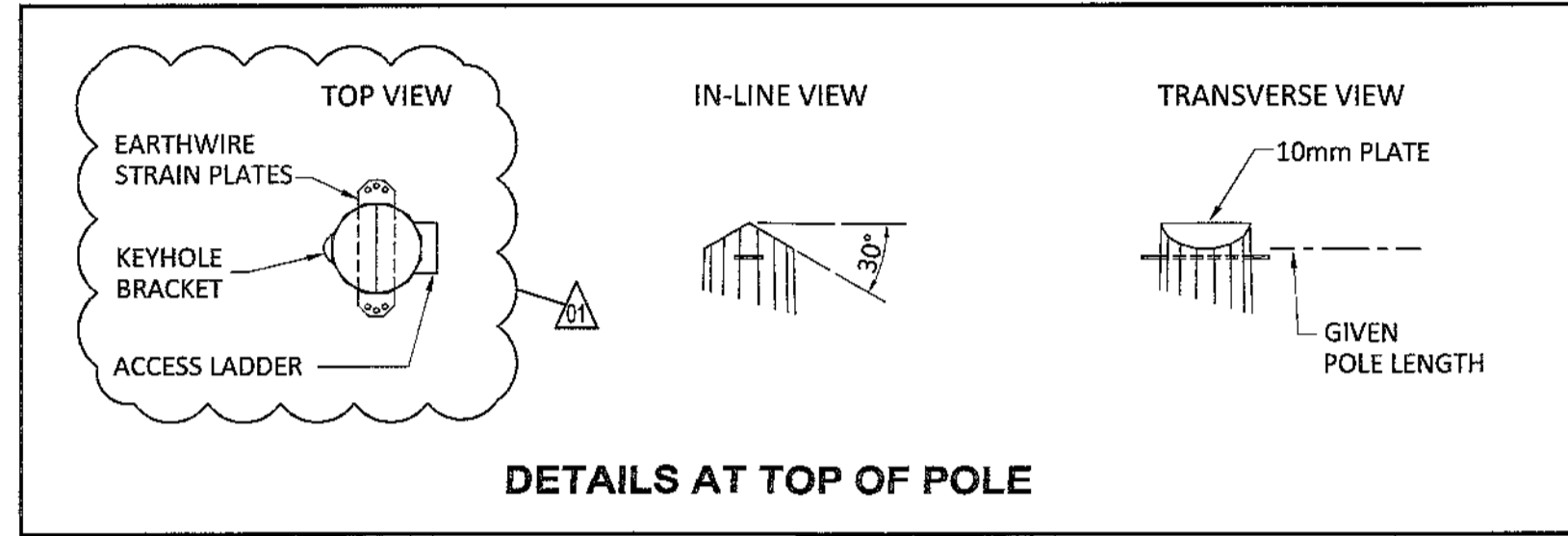
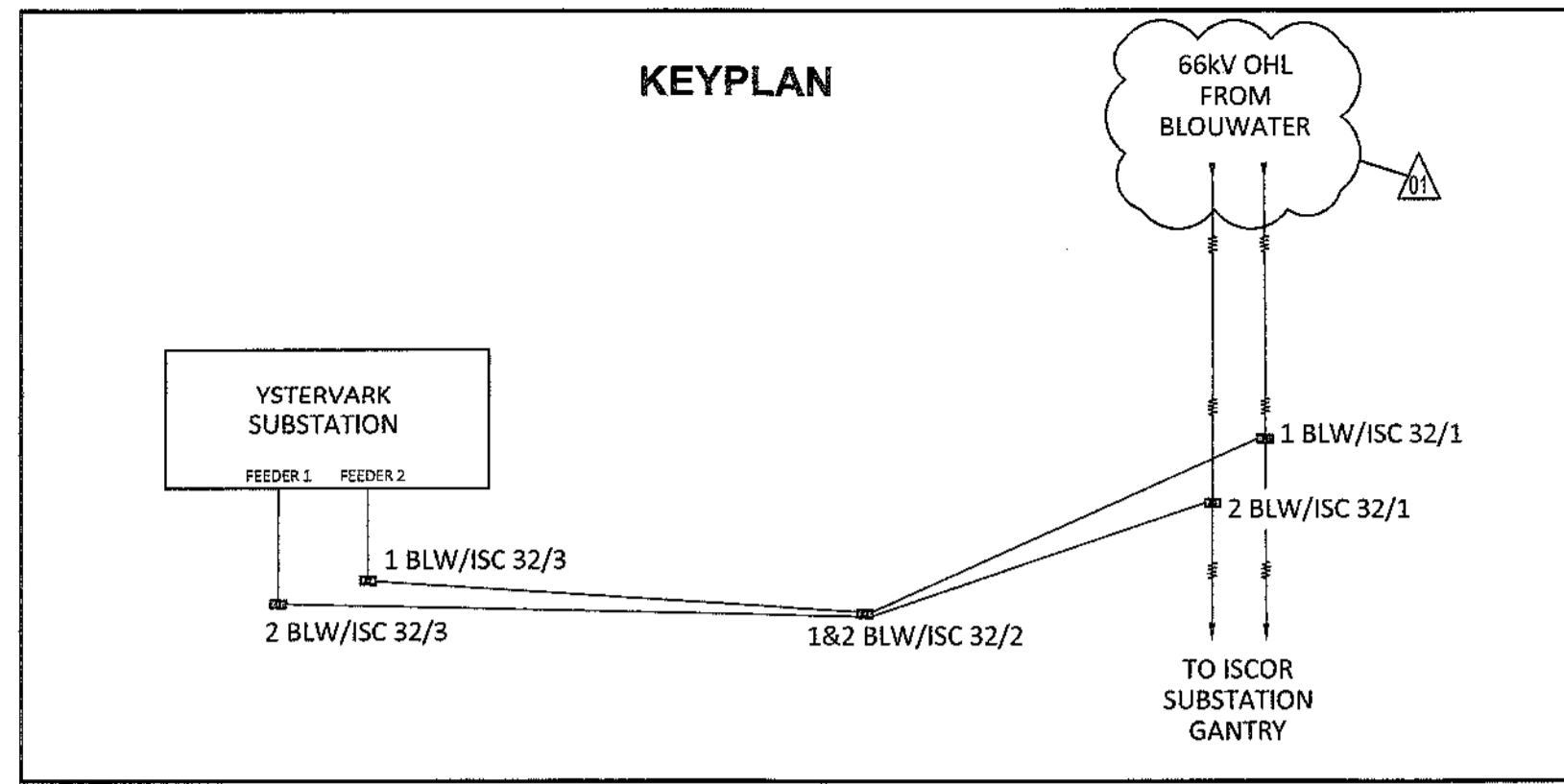
Transnet Capital Projects

TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS); REG. NO. 1960/0000046  
TABLE BAY BUILDING, TYGERBERG PARK,  
163 L'YS KRIGE DRIVE, PLATTEKLOOF, 8001  
TEL: 021 940 1999  
FAX: 088 677 2455

**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT**  
BULK POWER UPGRADE :  
66 kV BRANCH LINE MAST -  
TERMINAL STRUCTURE (1 BLW/ISC 32/3)

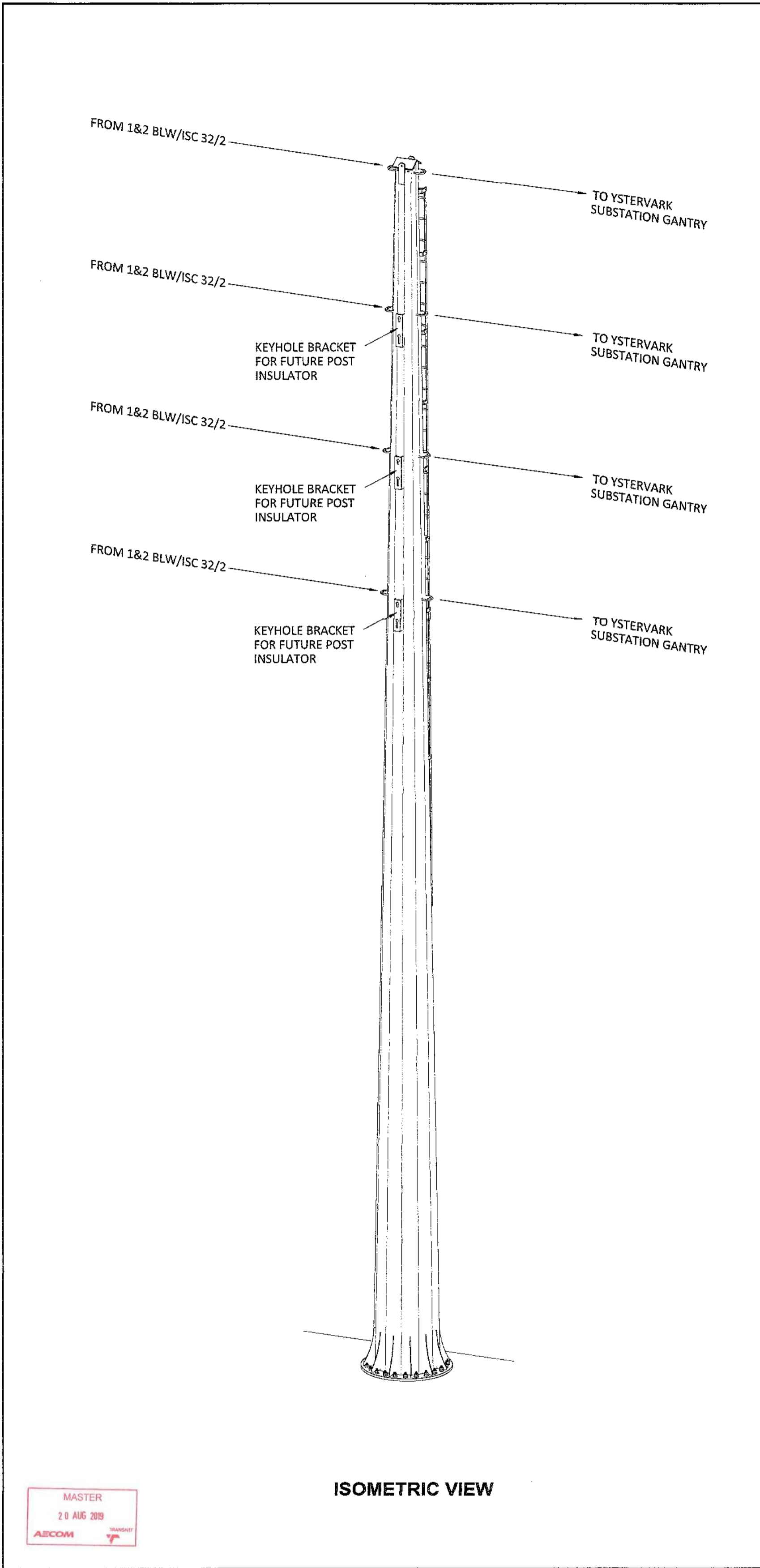
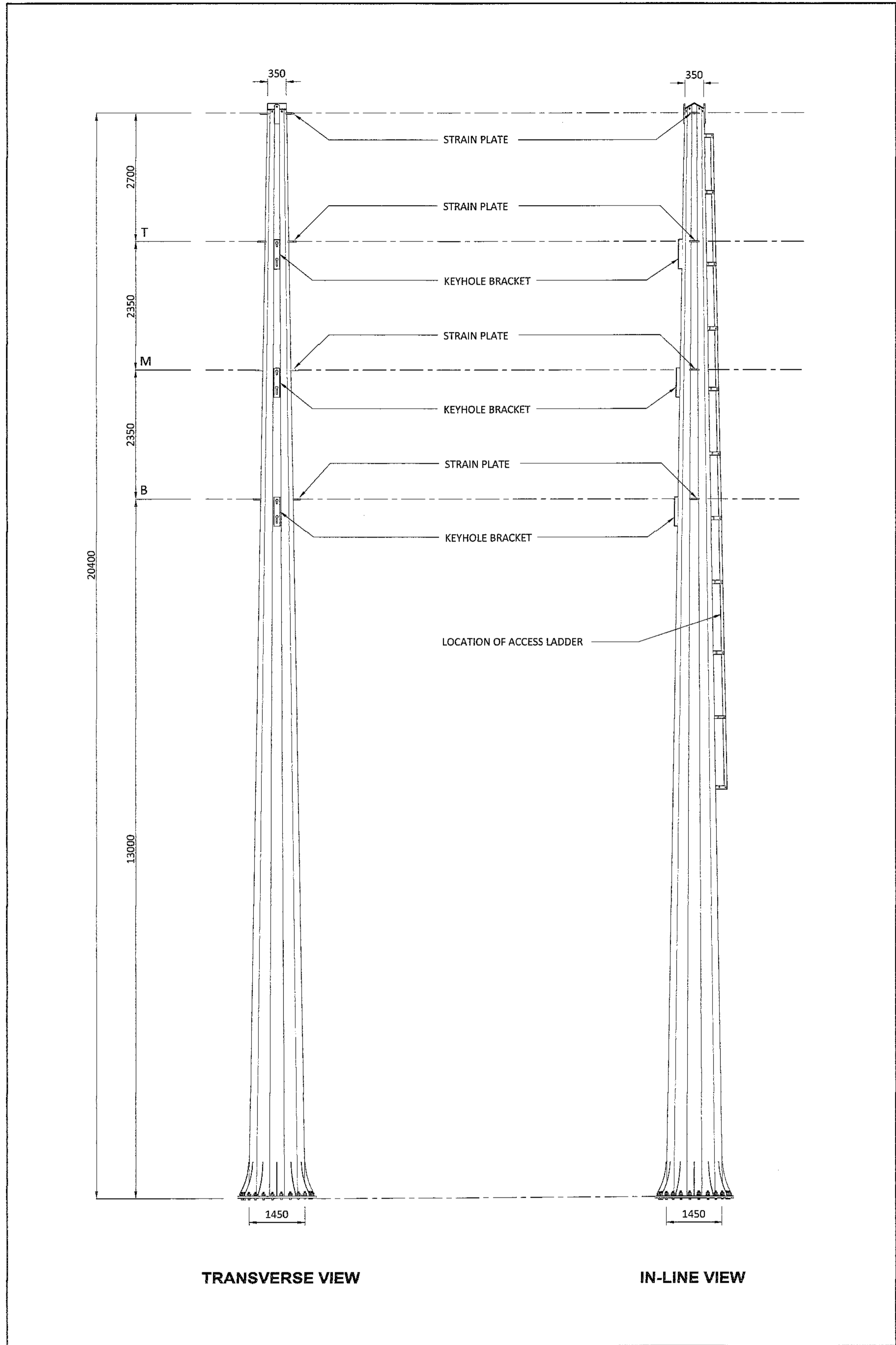
PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	3	0	E	DE	0036	01	01 AE



### SINGLE CIRCUIT TERMINAL STRUCTURE, 13m CAH

MAST NUMBER	2 BLW/ISC 32/3
PHASE CONDUCTOR : TYPE 1	CHICADEE ACSR
PHASE CONDUCTOR : TYPE 2	KINGBIRD ACSR (CLOSING SPAN)
OPGW CONDUCTOR	NONE
SHIELD CONDUCTOR	OAK AAAC
VERTICAL $\phi - \phi$ SPACING (m)	2.35
VERTICAL $\epsilon - \phi$ SPACING (m)	2.7
CONDUCTOR ATTACHMENT HEIGHT (m)	13
SIDES	16
APPROXIMATE TOTAL LENGTH (m)	20.4
TIP DIAMETER (mm)	350
BASE DIAMETER (mm)	1450
WALL THICKNESS (mm)	12
BASE PLATE O.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE I.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE THICKNESS (mm)	MANUFACTURER TO CONFIRM
H.D. BOLTS (qty)	MANUFACTURER TO CONFIRM
H.D. BOLTS DIAMETER (mm)	MANUFACTURER TO CONFIRM
H.D. BOLT PCD (mm)	MANUFACTURER TO CONFIRM
WORKING TIP LOAD (kN)	217.70
BASE G.L. MOMENT (kNm)	4441
BASELINE ESKOM STANDARD FOUNDATION REF (kNm)	5000
APPROXIMATE MASS (tons)	5.66
APPROXIMATE MAST UTILISATION (%)	30.0 (INITIAL)

- ### ADDITIONAL NOTES:
- THE DESIGN OF THESE STRUCTURES IS GENERALLY IN ACCORDANCE WITH ASCE STANDARD 48-11 DESIGN OF STEEL TRANSMISSION POLE STRUCTURES. MANUFACTURE AND INSTALLATION SHOULD ALSO MEET THE REQUIREMENT OF THE SAME PUBLICATION.
  - POLES WILL HAVE THE LOWEST NUMBER OF SLIP JOINTS IN CONFORMANCE WITH THE LIMITATION IMPOSED BY THE LENGTH OF THE GALVANIZING BATH. SLIP JOINTS LENGTH IS TO BE 1.5 TIMES LARGEST I.D. OF THE FEMALE SECTION.
  - FULL PENETRATION WELDS ARE TO BE USED ON:
    - ALL SECTIONS JOINED BY THE CIRCUMFERENTIAL WELDS.
    - ALL LONGITUDINAL WELDS WITHIN 75mm OF CIRCUMFERENTIAL WELDS OR IN THE FEMALE SECTION OF A SLIP JOINT.
  - ACCESS LADDERS ARE REQUIRED ON ALL STRUCTURES FROM APPROXIMATELY 6m ABOVE GROUND LEVEL.
  - FOR FURTHER INFORMATION, REFER TO RESPECTIVE ESKOM STANDARDS AND SPECIFICATIONS.
  - MATERIAL - S355JR STEEL.
  - WELDING TO BE 8mm CONTINUOUS SEAL TO SANS 10162, UNLESS REQUIRED OTHERWISE.
  - HOP DIP GALVANIZING TO SANS 121.
  - STRESS RELIEVING TO BE APPLIED IN ACCORDANCE WITH SANS 121 TOLERANCES:
    - ON DIMENSION 2mm
    - ON DRILLING CENTRE'S 2mm



DRAWING NO.	REFERENCE
	REFERENCE DRAWINGS

- ### NOTES
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - THIS DRAWING DEPICTS THE DESIGN INTENT ONLY, NOT THE FINAL DESIGN
  - THE MAST SHALL BE IN FULL COMPLIANCE WITH ESKOM WCOU, AND WHERE APPLICABLE, NATIONAL REQUIREMENTS.
  - FOR FINAL DESIGN PURPOSES, THE CONTRACTOR SHALL ALSO CROSS REFERENCE THE DRAWING WITH THE WORKS INFORMATION, TECHNICAL SPECIFICATIONS, BOQ, ESKOM (FDP) FINAL DESIGN PACKAGE AND ANY OTHER ASSOCIATED CONTRACT DOCUMENTATION.

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJÉ DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION OPGW OMITTED. REFER TO REV CLOUDS ON DRAWINGS	DEM	BS	CP	2019-08-19
00	ISSUED FOR CONSTRUCTION	DEM	BS	CP	2018-05-11

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DEM	[Signature]	'19 08 19				
CHECKED	DC	[Signature]	'19 08 19				
DESIGNED	NM	[Signature]	'19 08 19				
CHECKED	BS	[Signature]	'19 08 19				

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

PR. ENG. / PR. TECH. / PR. ARCH			
NAME	CPYM	DATE	

REG. NUMBER	2012/0126
SCALE	N.T.S.

Transnet Capital Projects

TRANSNET LTD. (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1990/000200/06  
TABLE BAY BUILDING, TYGERBERG PARK, 163 LUY'S KRIGÉ DRIVE, PLATTEKLOOF, 8001  
TEL: 021 940 1999  
FAX: 086 677 2456

### PORT OF SALDANHA

#### IRON ORE TIPPLER 3 PROJECT

#### BULK POWER UPGRADE :

#### 66 kV BRANCH LINE MAST -

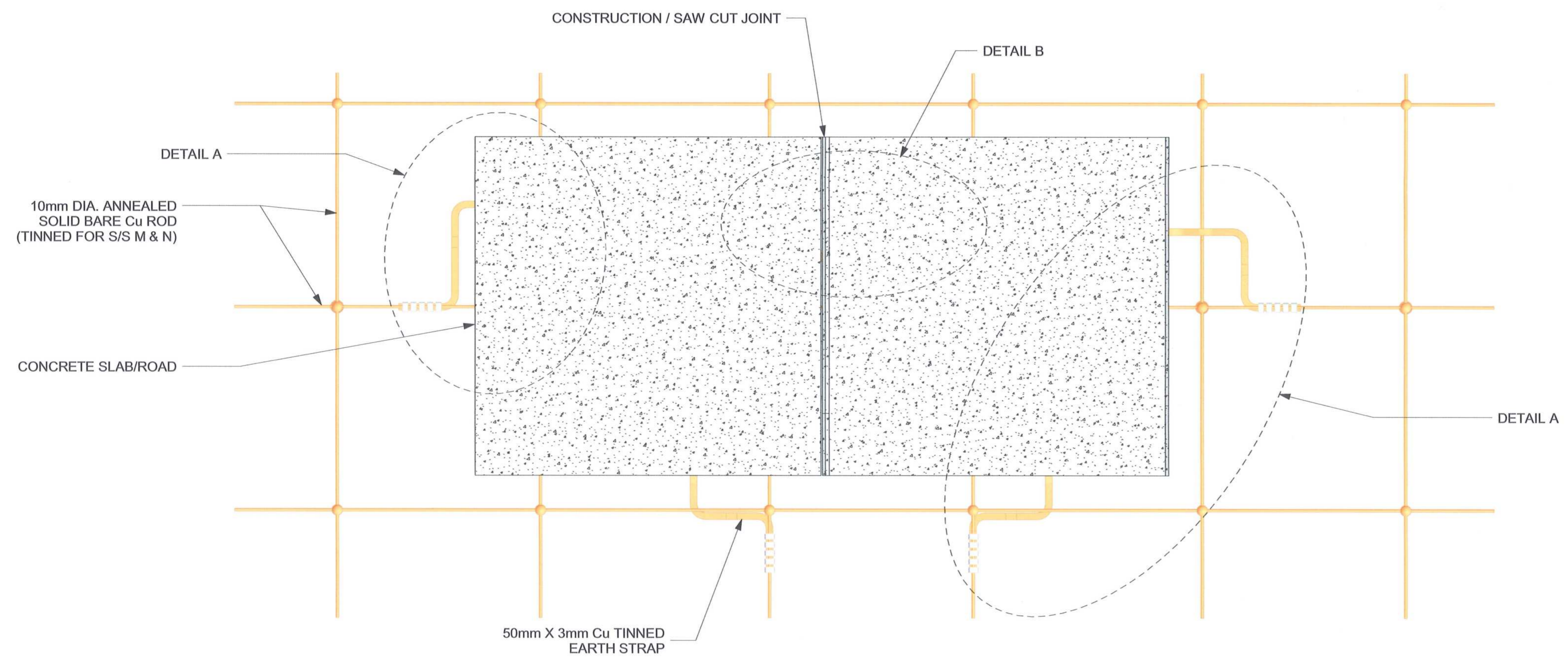
#### TERMINAL STRUCTURE (2 BLW/ISC 32/3)

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	3	0	E	0037	01	01	AE

A

B

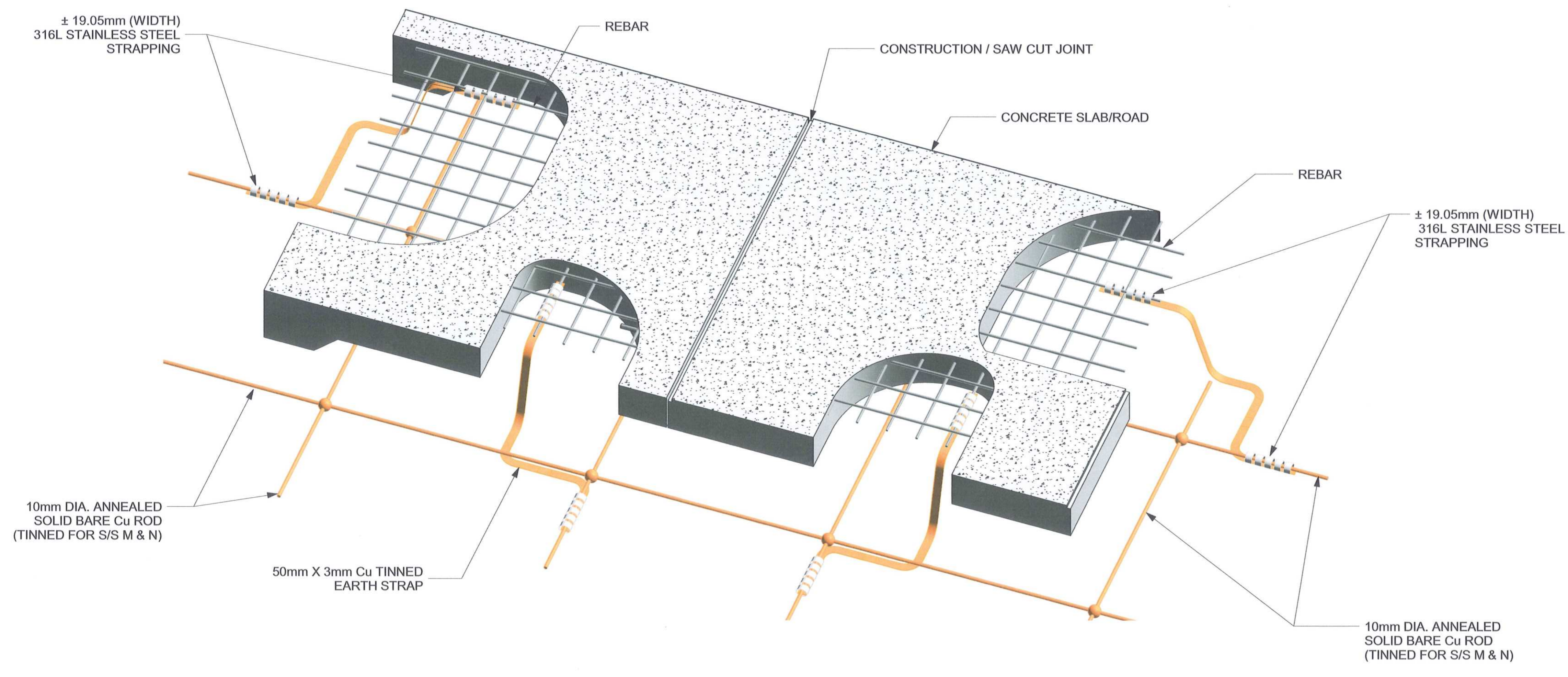
C



**1** PLAN VIEW OF TYPICAL CONCRETE SLAB/ROAD REBAR EARTHING  
01003 SCALE: N.T.S.

D

E



**A** TYPICAL DETAIL A  
01003 SCALE: N.T.S.

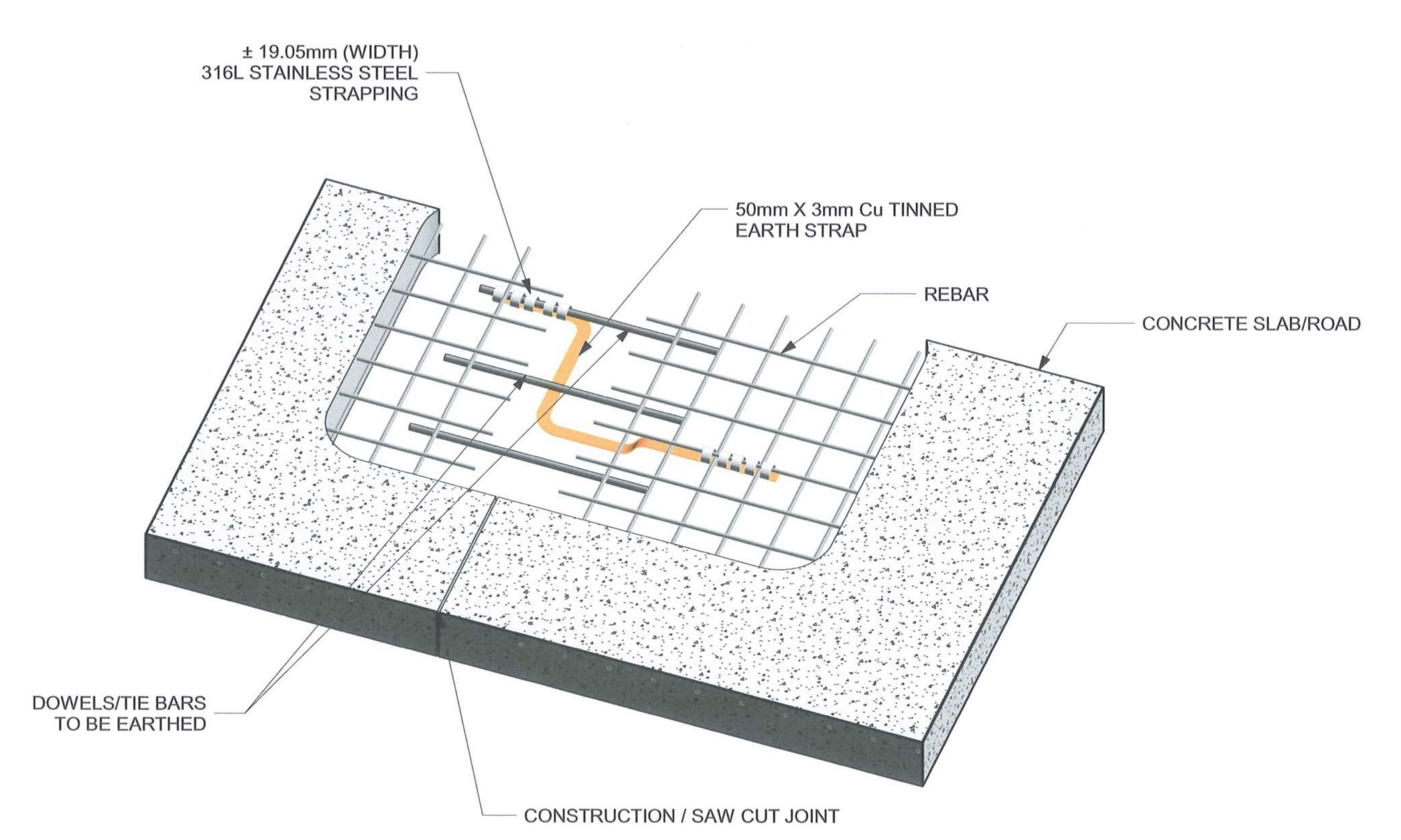
A

B

C

D

E



**B** TYPICAL DETAIL B  
01003 SCALE: N.T.S.

DRAWING NO.	REFERENCE
01003	REFERENCE DRAWINGS
1	
2	
3	
4	
5	
6	
7	
8	

- NOTES**
- DO NOT SCALE DRAWINGS - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - ALL STEEL/METAL WORK SHALL BE ELECTRICALLY CONTINUOUS.
  - ALL STEEL/METAL WORK SHALL BE BONDED BY 50mm X 3mm Cu TINNED EARTH STRAPS, UNLESS OTHERWISE SPECIFIED OR INSTRUCTED.
  - REBAR TO REBAR CONNECTIONS SHALL BE BONDED BY 50mm X 3mm Cu TINNED EARTH STRAPS, UNLESS OTHERWISE SPECIFIED OR INSTRUCTED.
  - EARTH STRAP CONNECTIONS ONTO REBAR SHALL BE BY MEANS OF 5 X 316L STAINLESS STEEL STRAPPING ± 19.05mm (WIDTH), UNLESS AGREED OTHERWISE.
  - ALL CONNECTIONS ONTO EARTH GRID/MAT SHALL BE EXOTHERMICALLY WELDED, UNLESS OTHERWISE SPECIFIED OR INSTRUCTED.
  - EACH EARTH STRAP CONNECTED TO EARTH GRID/MAT SHALL BE FIXED TO A DIFFERENT EARTH ROD.
  - GALVANIC CORROSION BETWEEN MATERIALS SHALL BE AVOIDED AT ALL TIMES.
  - NO EARTH CONNECTIONS SHALL BE COVERED UP BEFORE THE EMPLOYER HAS INSPECTED AND APPROVED THEM.
  - THREE THICK LAYERS OF BITUMEN TO BE APPLIED ON ANY EXOTHERMIC WELD OR BRAZED POINTS, WHERE APPLICABLE.
  - FOR ANY OTHER CONNECTIONS WHICH MAY NOT APPEAR ON THE DRAWINGS, THE CONTRACTOR SHALL NOTIFY THE EMPLOYER, WHICH WILL MAKE A RULING AS TO WHICH CONNECTION TYPE TO BE USED.
  - STEEL/METAL/CONCRETE INFRASTRUCTURE ILLUSTRATIVE ONLY AND MAY NOT REFLECT ACTUAL INFRASTRUCTURE TO BE CONSTRUCTED.

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL GROENE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1996/006628/07

NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	D.D	B.S	C.P	2019-02-12
0A	ISSUED FOR INTERNAL REVIEW	D.D	B.S	C.P	2019-02-11

**REVISIONS**

This document including all design and information herein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purposes.

CONTRACTOR/CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	D.D		19 02 12
				CHECKED	K.S		19 02 12
				DESIGNED	B.S		19 02 12
				CHECKED	C.P		19 02 12

**OPERATING DIVISIONS**

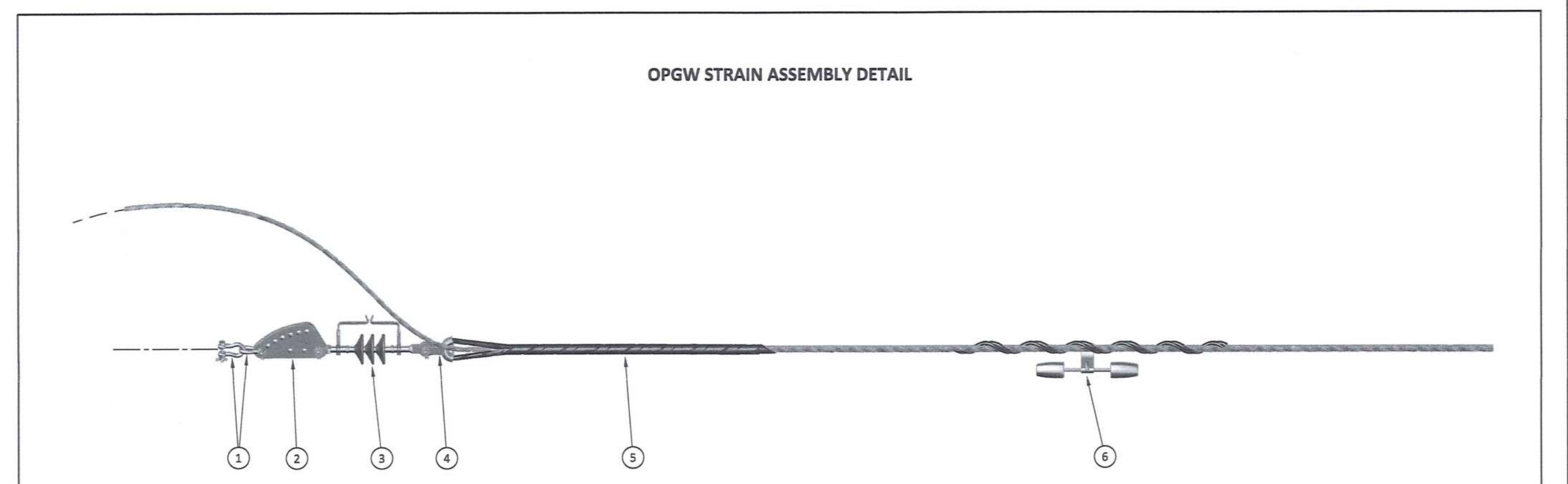
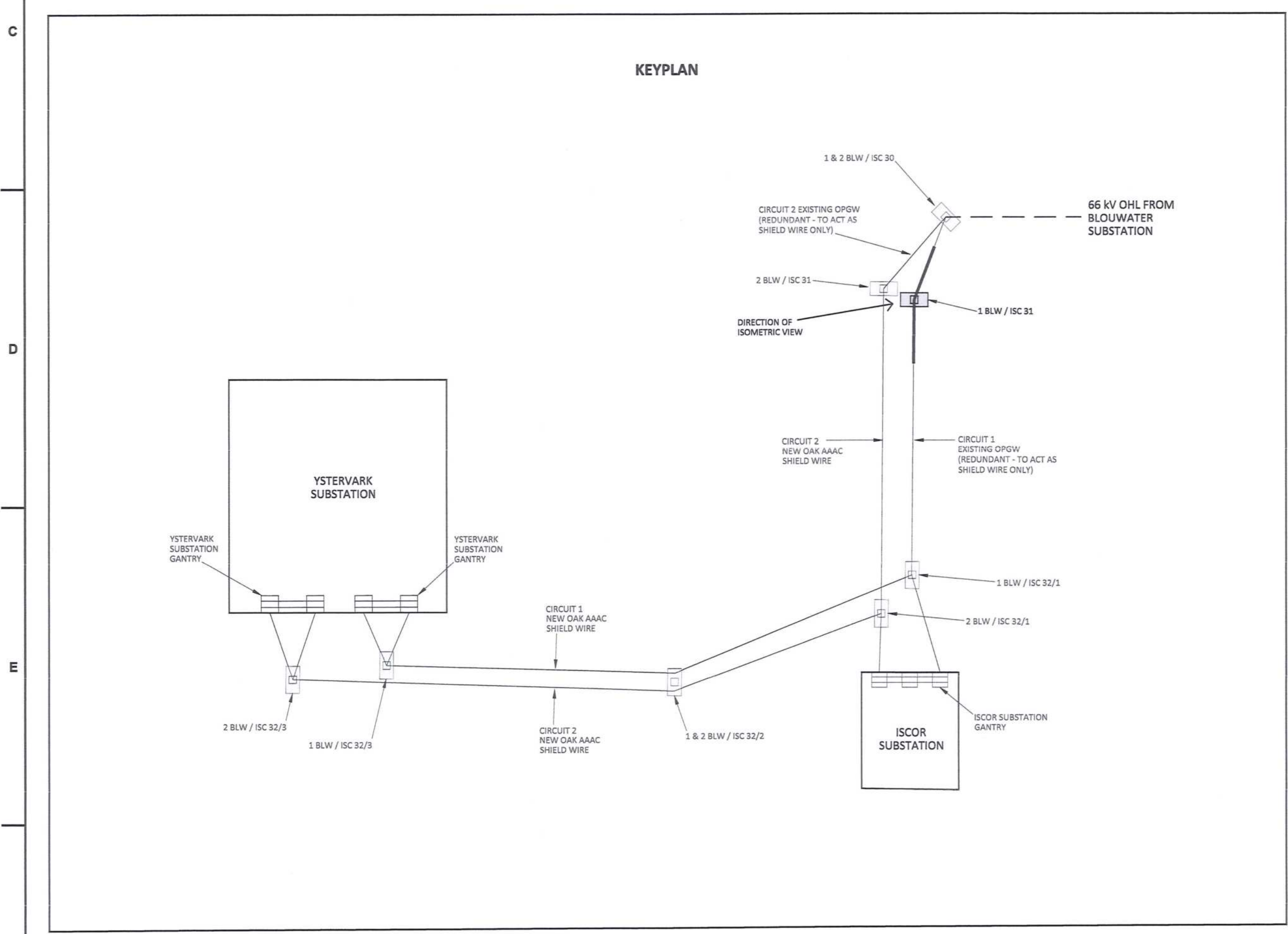
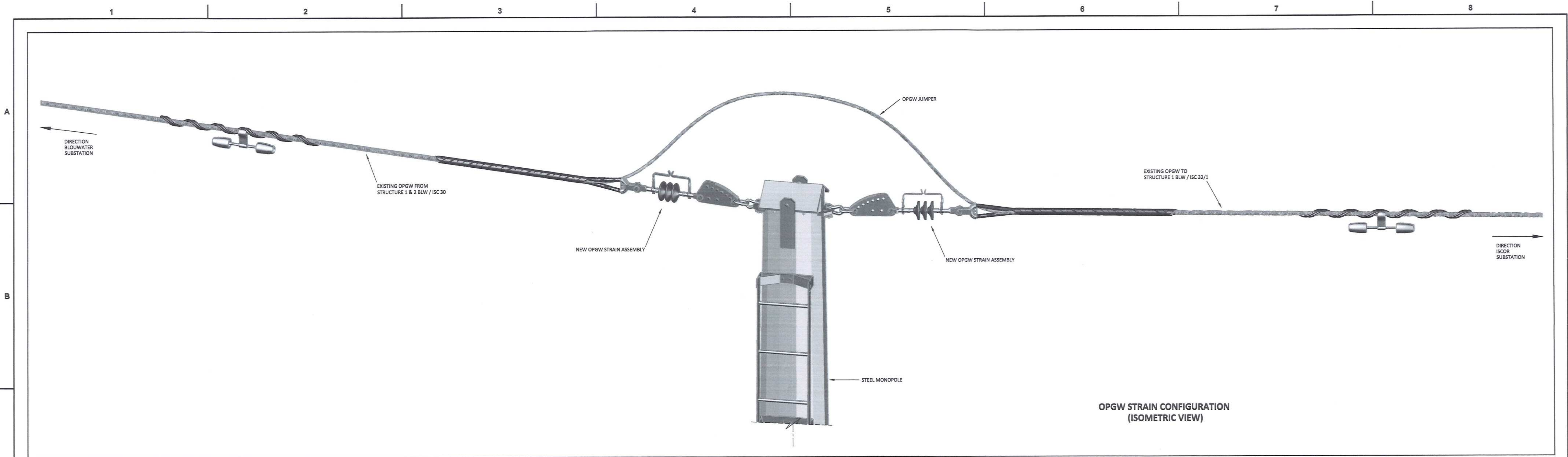
TITLE	NAME	SIGN	DATE
P/RENG./PR/TECH./PR/ARCH			
NAME	C.P.M		
SIGNATURE			19 02 12
REG. NUMBER	201270126		
SCALE:			

Transnet Capital Projects  
TRANSNET

**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE:  
TYPICAL CONCRETE SLAB/ROAD  
EARTHING DETAIL**

PROJECT NUMBER	00	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	3	0	E	DE	0039	01	00 AE



ITEM	OPGW STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	4	D-DT-7017	0169406
2	SAG ADJUSTOR, 120 kN	1	2	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN (WITH ARCING HORNS - 8 mm SPARK GAP)	1	2	D-DT-7012	0167605
4	THIMBLE CLEVIS, 120 kN	1	2	BUY OUT - TO SUITE	-
5	PREFORMED HELICALLY DEAD END ASSEMBLY TO OPGW MANUFACTURER SPECIFICATIONS (INCLUDES REINFORCING HELICAL ARMOUR ROD SET)	1	2	BUY OUT - TO SUITE	-
6	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OPGW	1	2	BUY OUT - TO SUITE	-

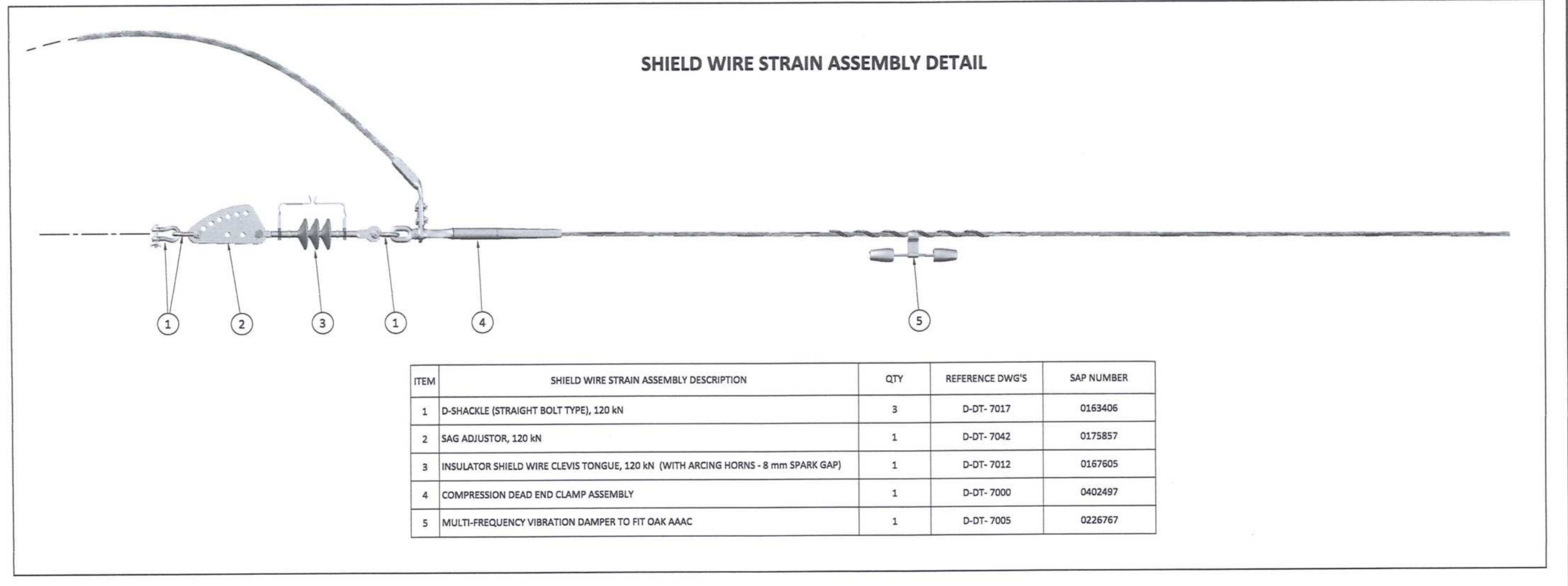
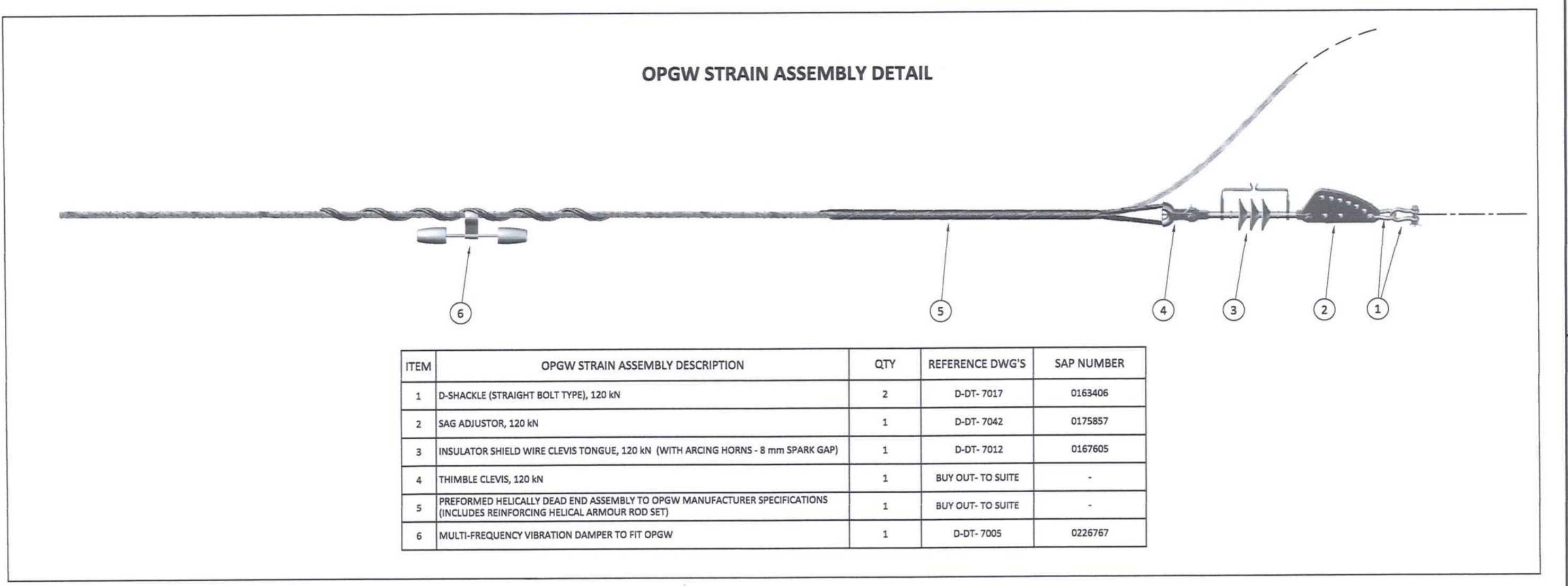
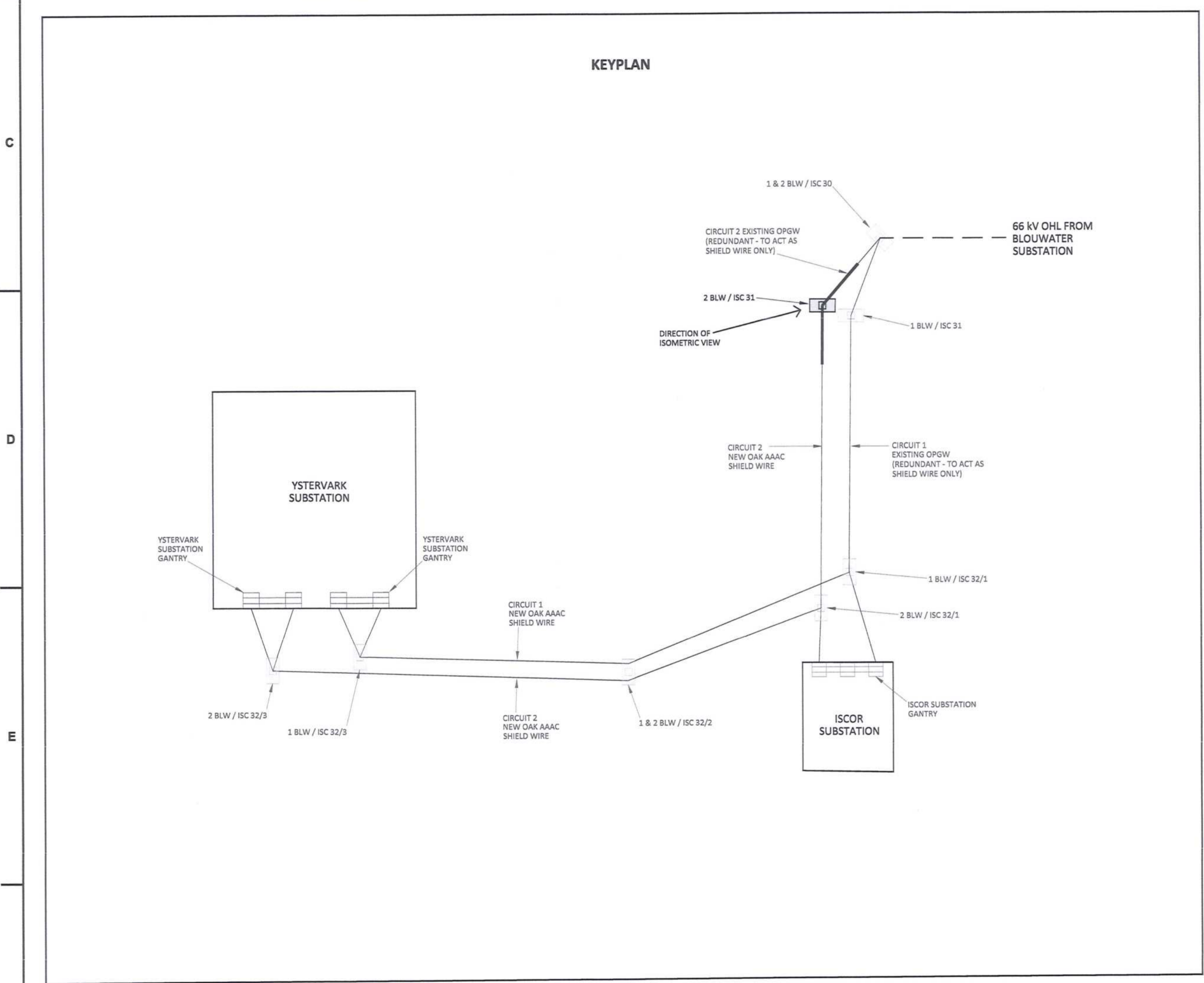
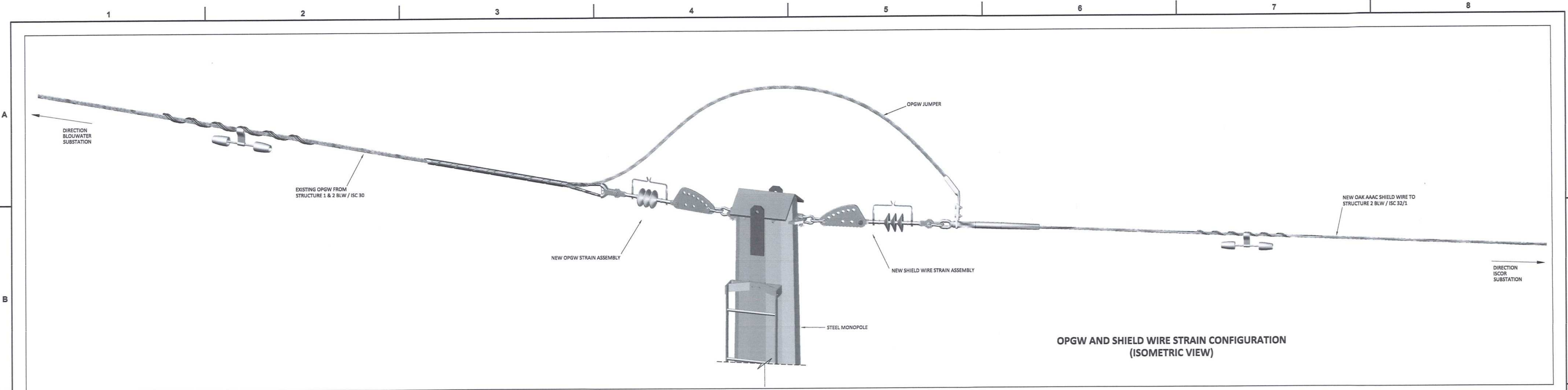
DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**  
 1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
 2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DO		19 09 25				
CHECKED	KS		19 09 25				
DESIGNED	WV		19 09 25				
CHECKED	BS		19 09 25				
OPERATING DIVISIONS				OPERATING DIVISIONS			
TITLE				TITLE			
NAME				NAME			
SIGN				SIGN			
DATE				DATE			
BY				BY			
CHKD				CHKD			
APPD				APPD			
DATE				DATE			
<b>REVISIONS</b> DD ISSUED FOR CONSTRUCTION DD BS RS 2019-09-28 NO. DESCRIPTION BY CHKD APPD DATE							
This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may not be used for any unrelated purpose.							

Transnet Capital Projects  
 TRANSNET  
**PORT OF SALDANHA**  
 IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE :  
 66 kV BRANCH LINE MASTS - 1 BLW / ISC 31  
 OPGW STRAIN CONFIGURATION

PROJECT NUMBER: 191247011213001E0104101100AE  
 SCALE: N.T.S.



DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.

2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	BS	RS	2019-09-26

**REVISIONS**

This document including all design and drawings remain the Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	BS	19/09/20	PRELIMINARY ARCH	DD	BS	19/09/20
CHECKED	WS	RS	19/09/20	NAME	DD	BS	19/09/20
DESIGNED	WV	RS	19/09/20	SIGNATURE	DD	BS	19/09/20
CHECKED	BS	RS	19/09/20	REG. NUMBER	547071		
OPERATING DIVISIONS				SCALE: N.T.S.			

Transnet Capital Projects

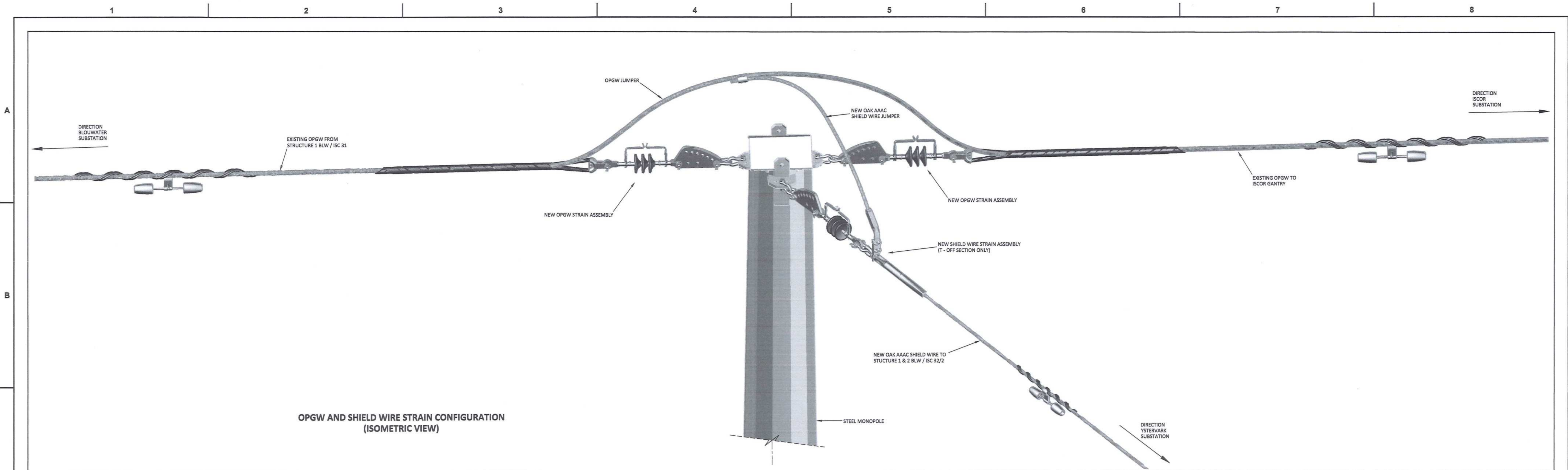
TRANSNET

**PORT OF SALDANHA**

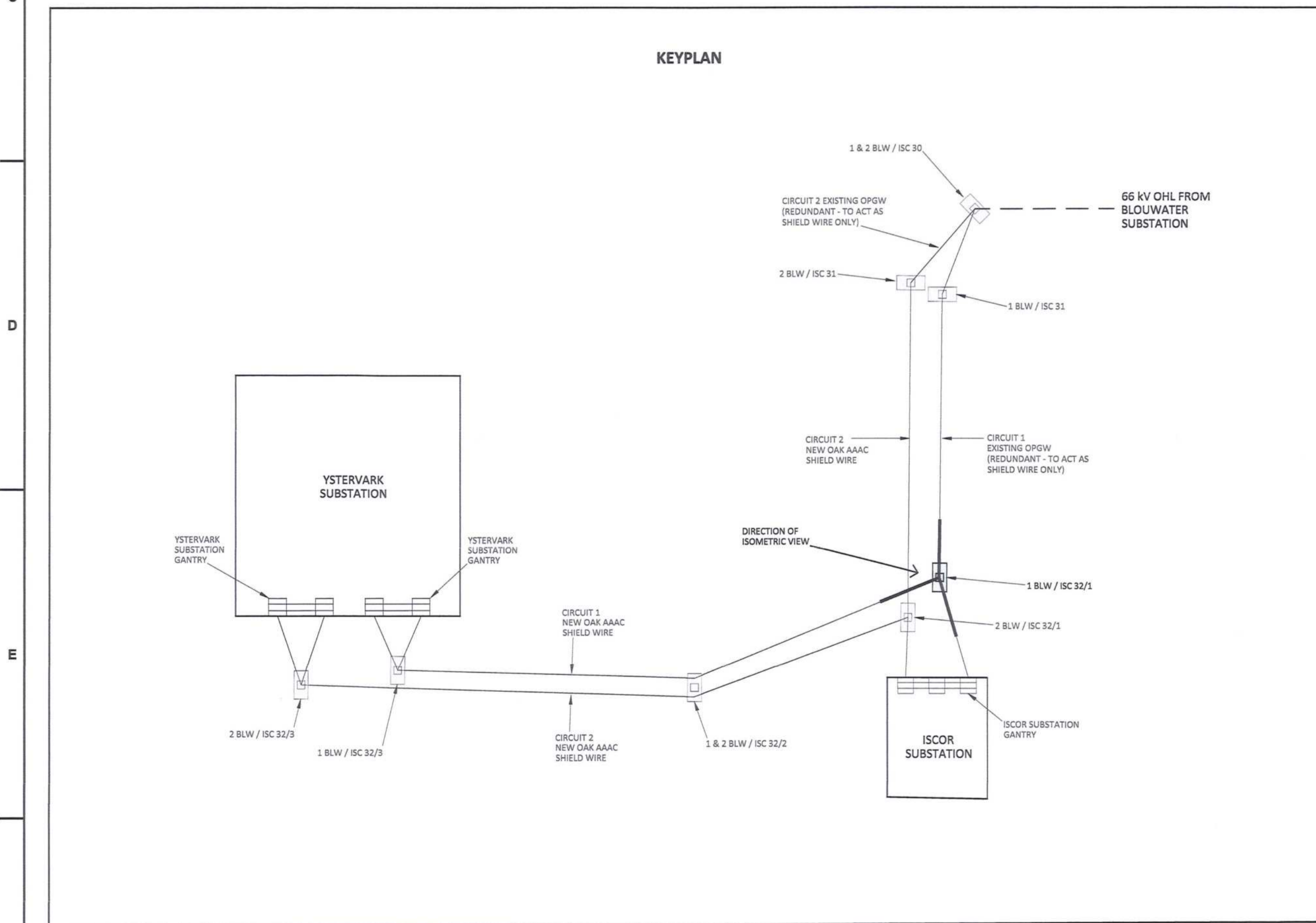
IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE:  
66 kV BRANCH LINE MASTS - 2 BLW / ISC 31  
OPGW AND SHIELD WIRE STRAIN CONFIGURATION

PROJECT NUMBER: 19124701123101E0E004110100AE

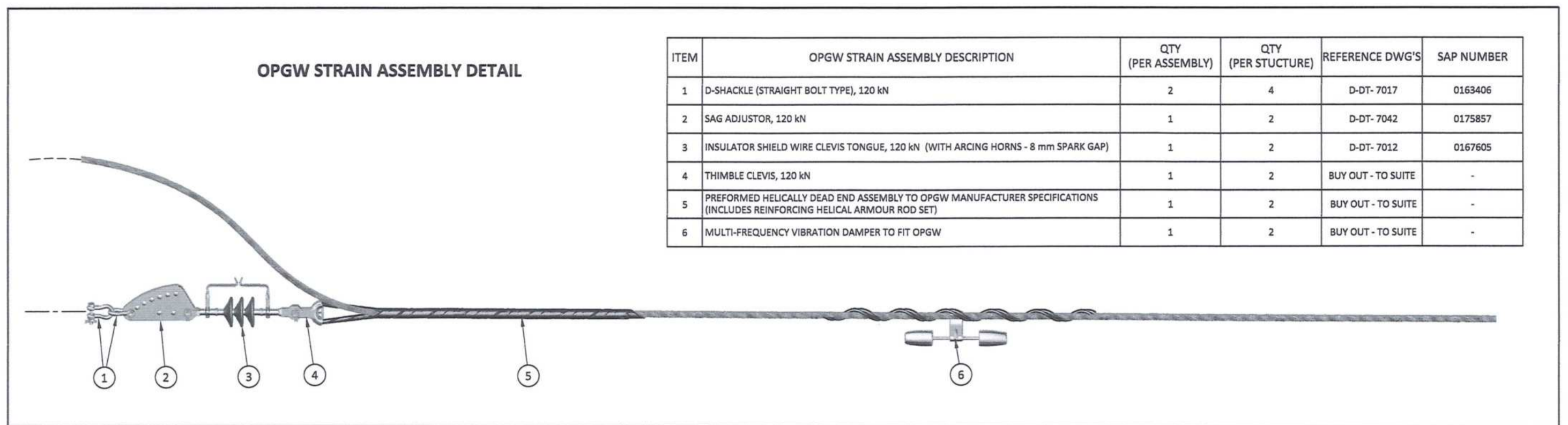




OPGW AND SHIELD WIRE STRAIN CONFIGURATION (ISOMETRIC VIEW)

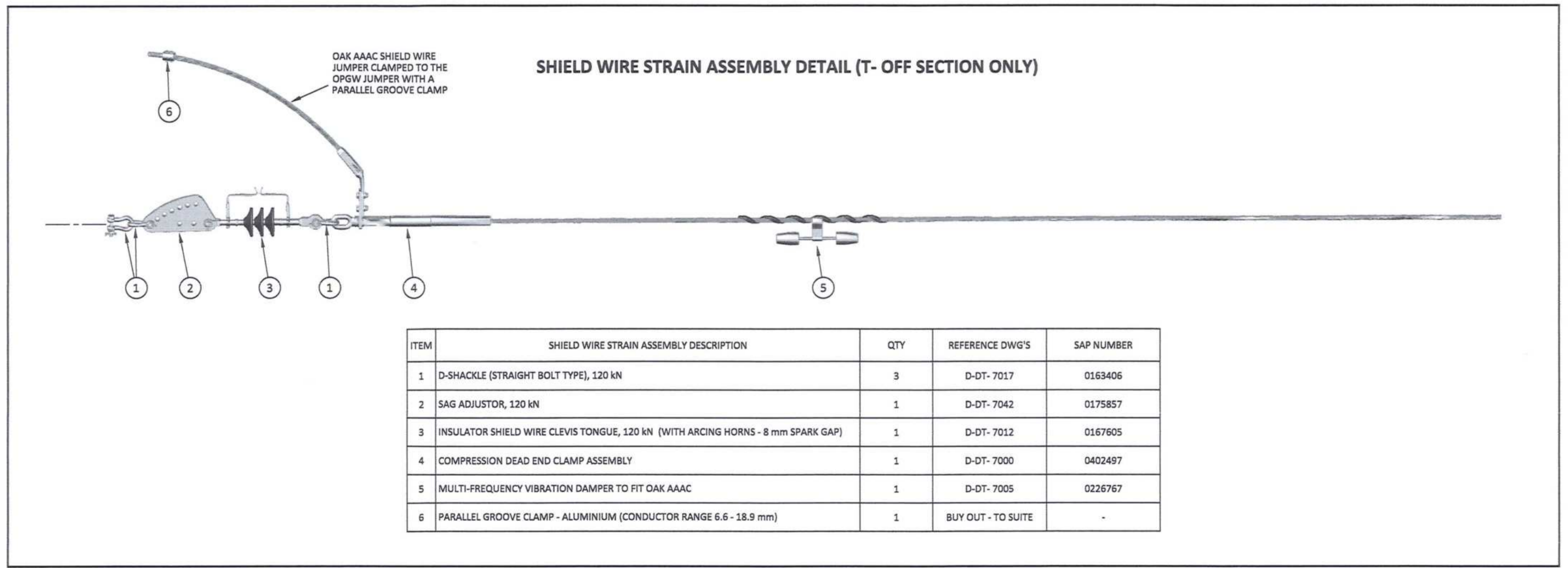


KEYPLAN



OPGW STRAIN ASSEMBLY DETAIL

ITEM	OPGW STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	4	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	2	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN (WITH ARCING HORNS - 8 mm SPARK GAP)	1	2	D-DT-7052	0167605
4	THIMBLE CLEVIS, 120 kN	1	2	BUY OUT - TO SUITE	-
5	PREFORMED HELICALLY DEAD END ASSEMBLY TO OPGW MANUFACTURER SPECIFICATIONS (INCLUDES REINFORCING HELICAL ARMOUR ROD SET)	1	2	BUY OUT - TO SUITE	-
6	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OPGW	1	2	BUY OUT - TO SUITE	-



SHIELD WIRE STRAIN ASSEMBLY DETAIL (T-OFF SECTION ONLY)

ITEM	SHIELD WIRE STRAIN ASSEMBLY DESCRIPTION	QTY	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	3	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN (WITH ARCING HORNS - 8 mm SPARK GAP)	1	D-DT-7052	0167605
4	COMPRESSION DEAD END CLAMP ASSEMBLY	1	D-DT-7000	0402487
5	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OAK AAAC	1	D-DT-7005	0226787
6	PARALLEL GROOVE CLAMP - ALUMINIUM (CONDUCTOR RANGE 6.6 - 18.9 mm)	1	BUY OUT - TO SUITE	-

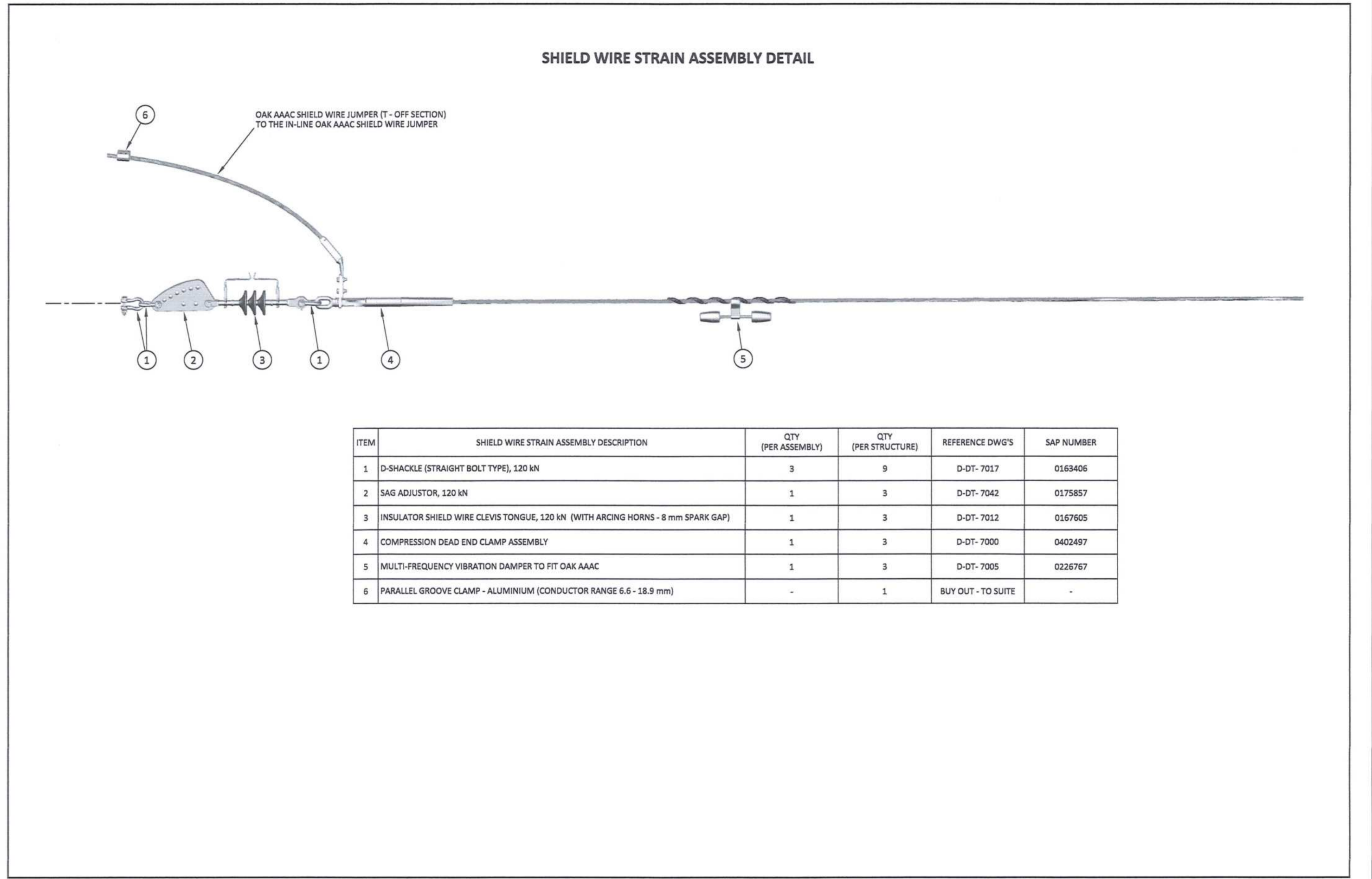
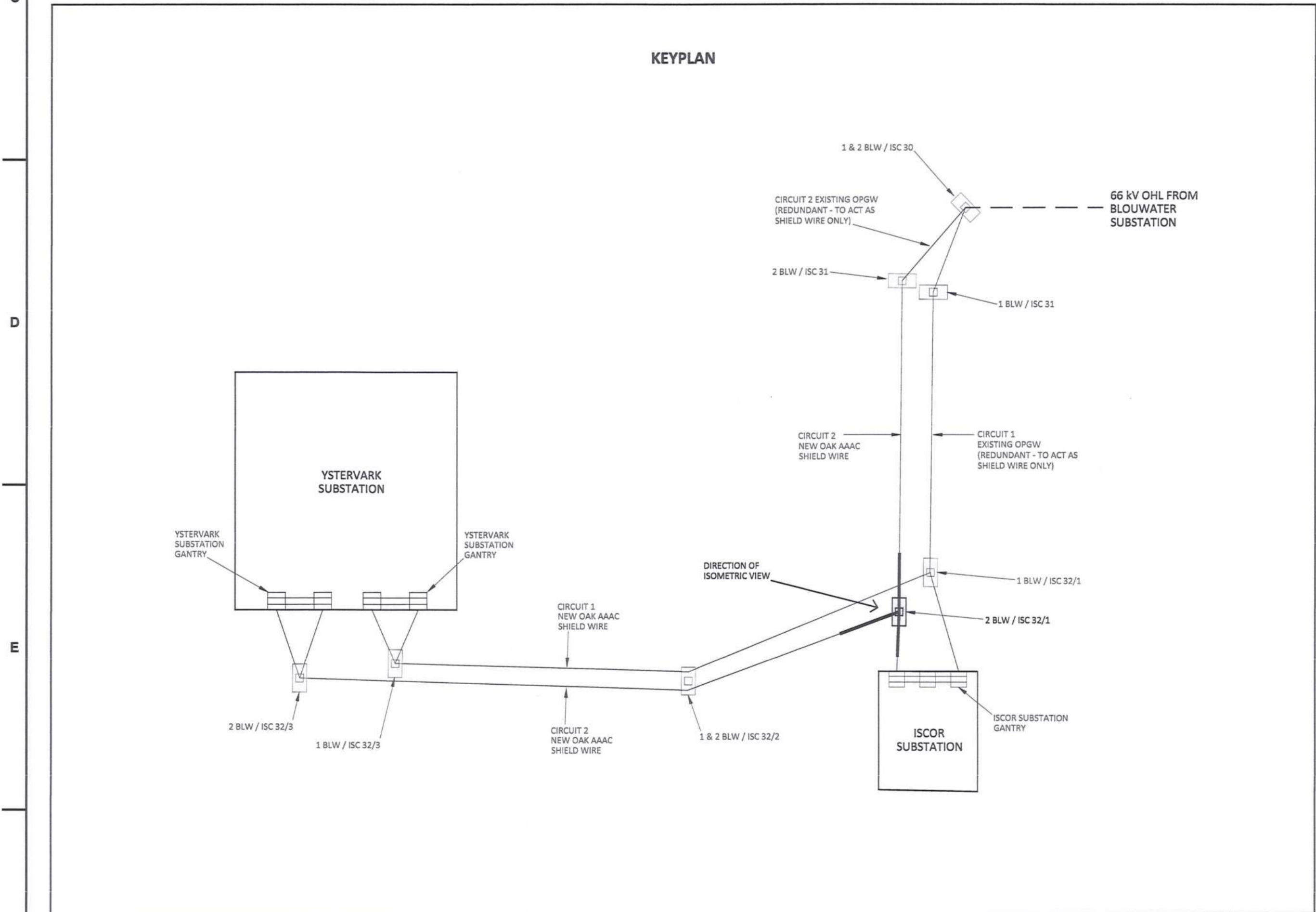
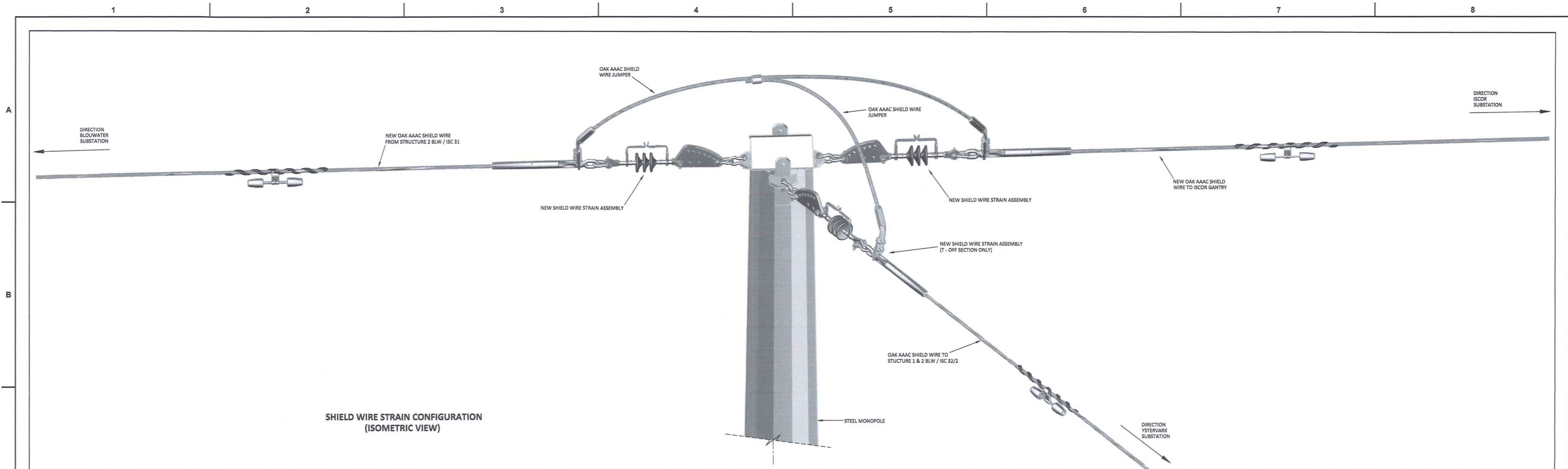
DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

NOTES  
 1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
 2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DO	BS	RS	2019-09-26

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DO		19/09/25				
CHECKED	KS		19/09/25				
DESIGNED	WV		19/09/25				
CHECKED	BS		19/09/25				

Transnet Capital Projects  
 TRANSNET  
 PORT OF SALDANHA  
 IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE  
 66 kV BRANCH LINE MASTS - 1 BLW / ISC 32/1  
 OPGW AND SHIELD WIRE STRAIN CONFIGURATION



DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

CONTRACTOR / CONSULTANT				TRANSMET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DO		19/08/20	PRE-ENG / PR-TECH / PR-ARCH			
CHECKED	KS		19/08/20				
DESIGNED	WV		19/08/20				
CHECKED	BS		19/08/20				

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	BS	RS	2019-08-26

**REVISIONS**

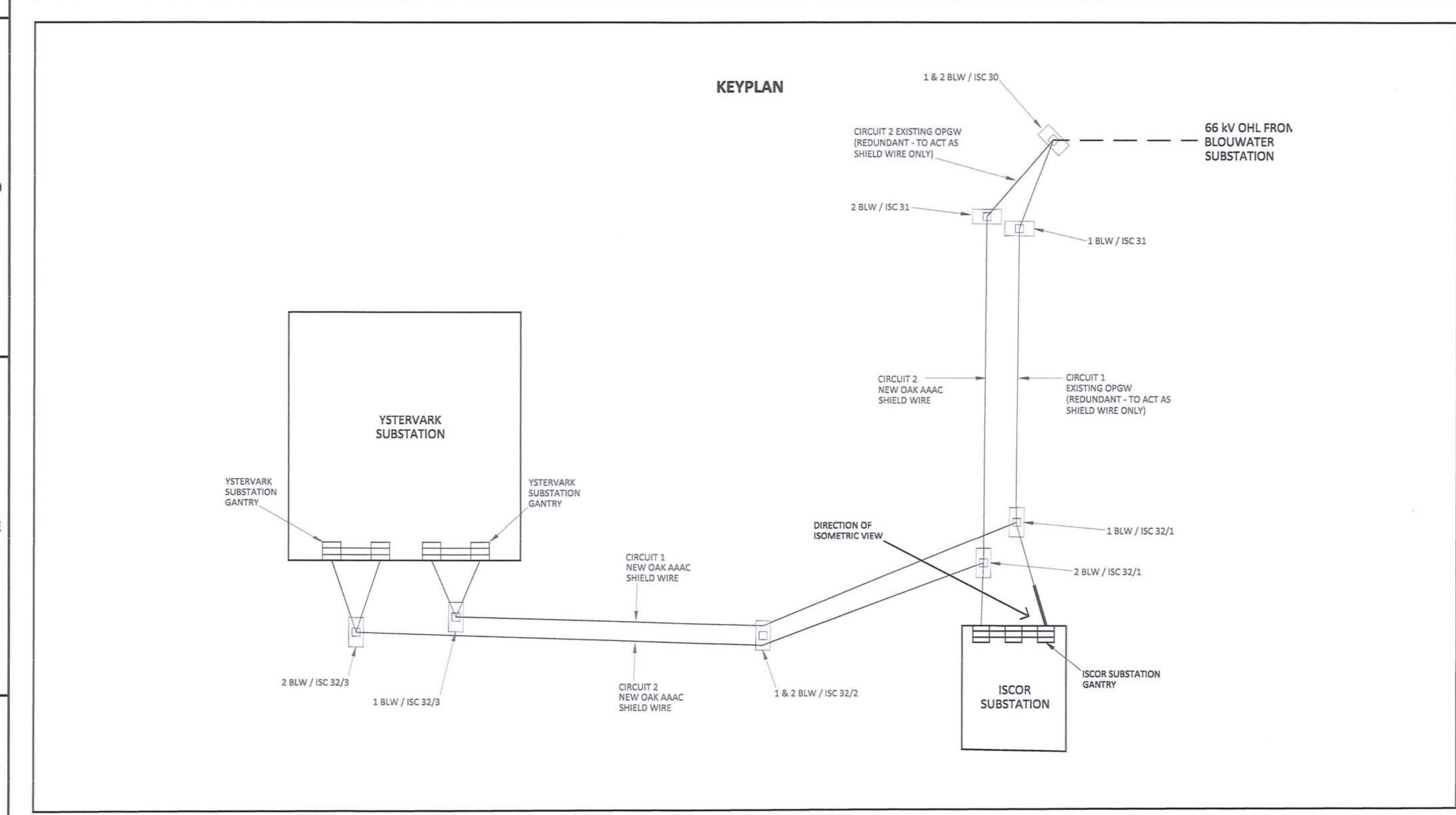
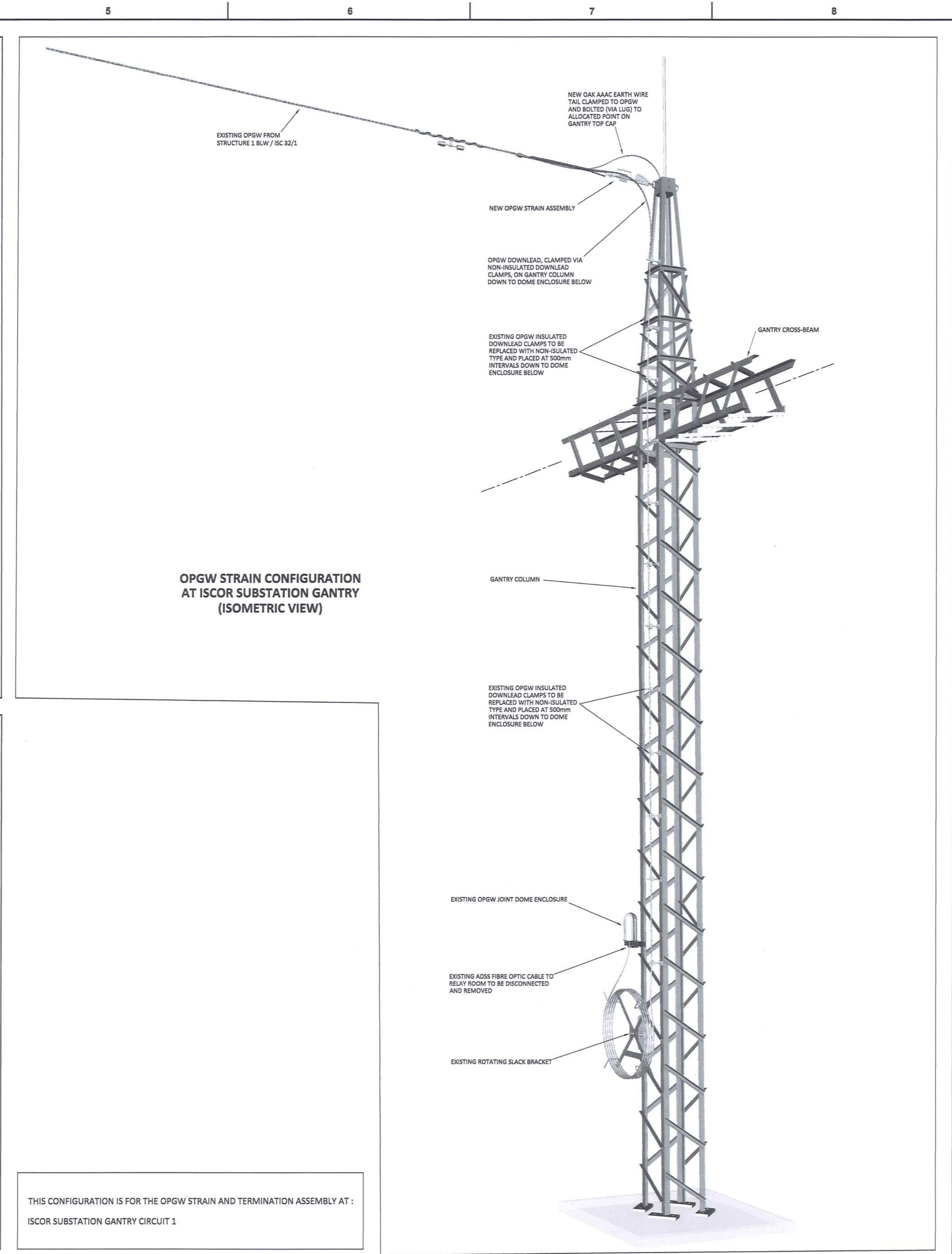
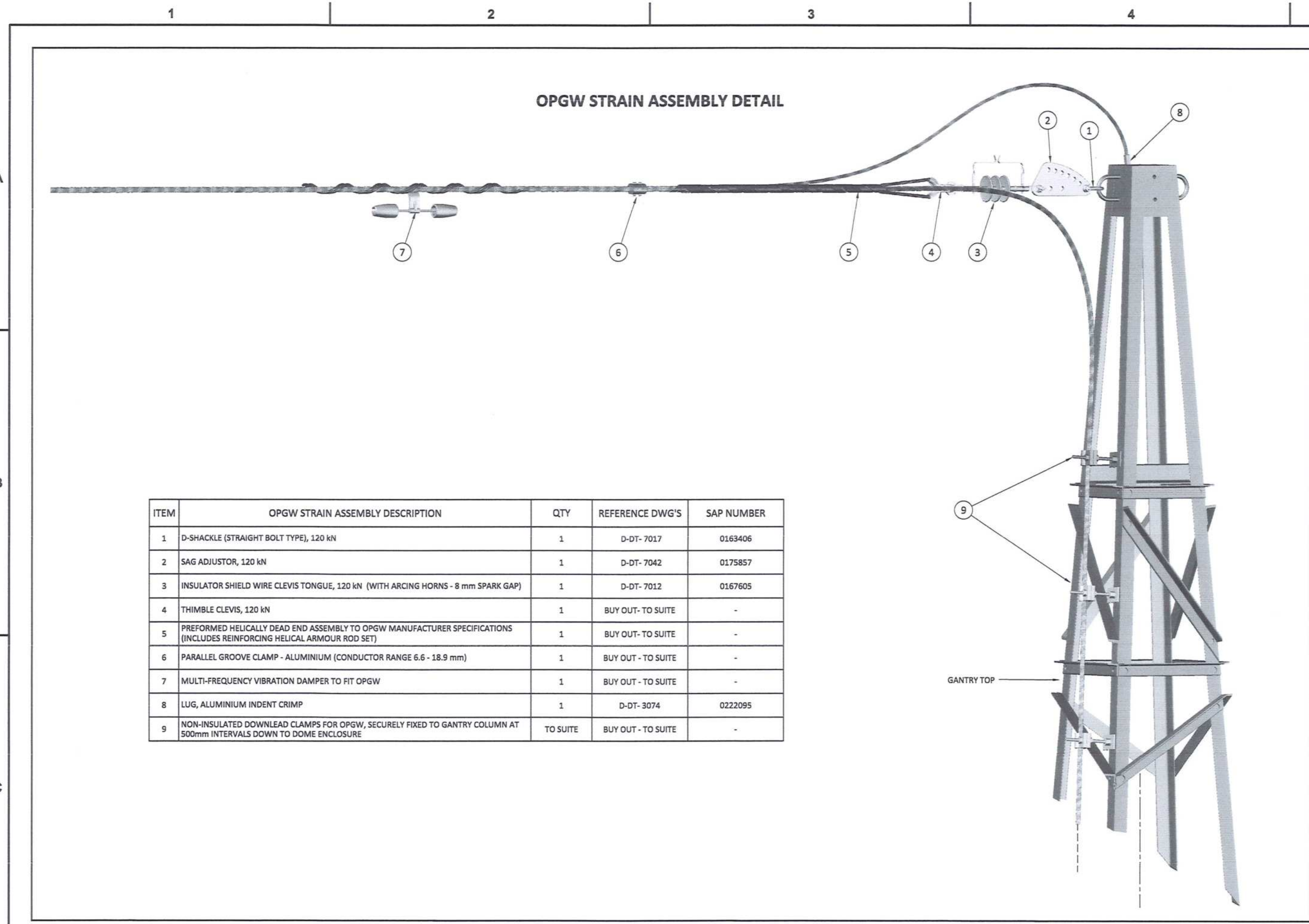
This document is the property of Transmet Capital Projects. It is to be used for the project only. All other rights are reserved by Transmet. This document may not be used for any other purpose.

Transmet Capital Projects  
 TABLE BAY BUILDING, TYDERSBERG PARK,  
 163 LITE BRIDGE DRIVE, PLATTEKLOOF,  
 8001  
 TEL: 021 940 1009  
 FAX: 086 677 2405

**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE :  
 66 kV BRANCH LINE MASTS - 2 BLW / ISC 32/1  
 SHIELD WIRE STRAIN CONFIGURATION**

PROJECT NUMBER: 1902470123010E0104301100  
 SCALE: N.T.S.



**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

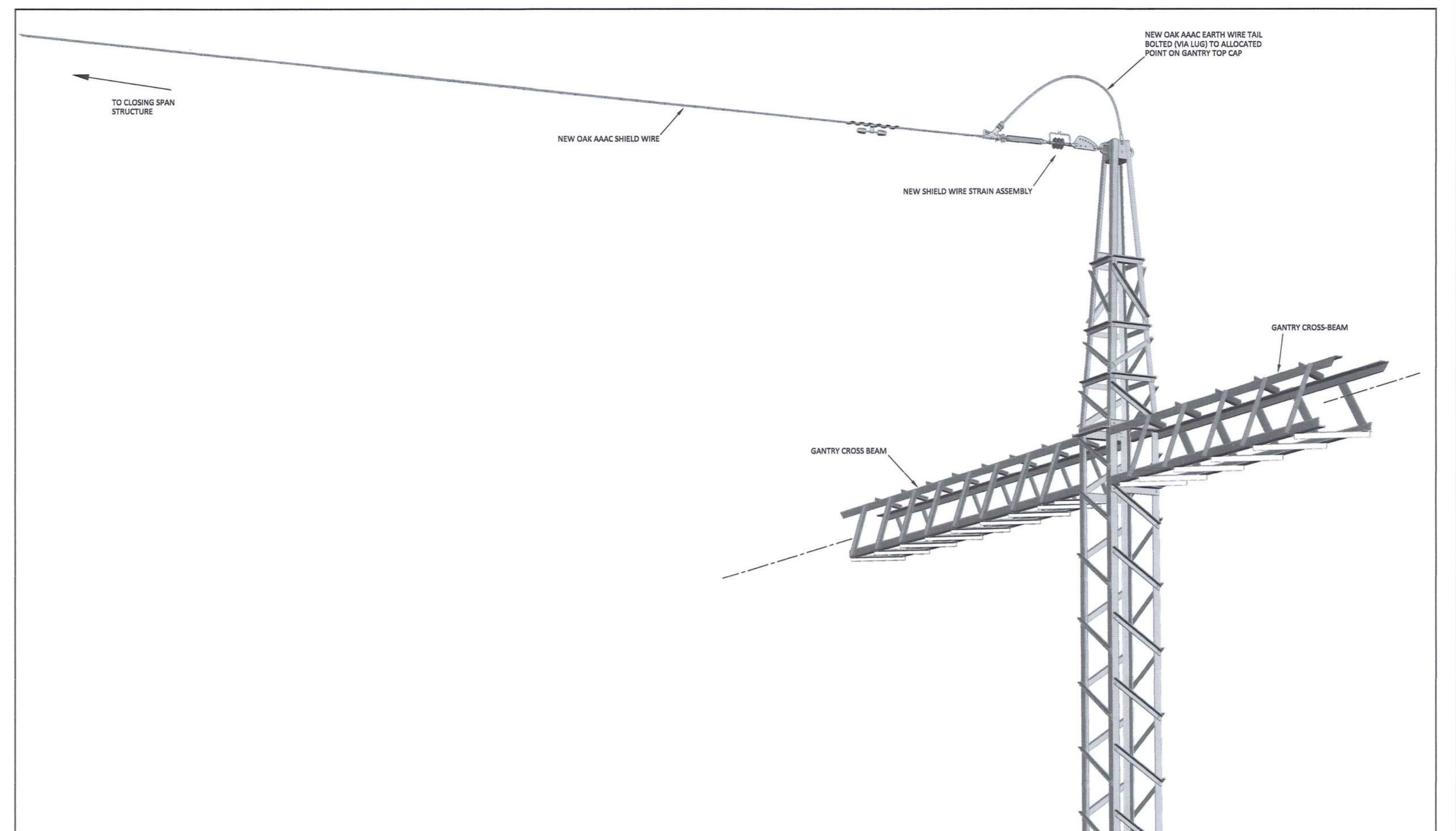
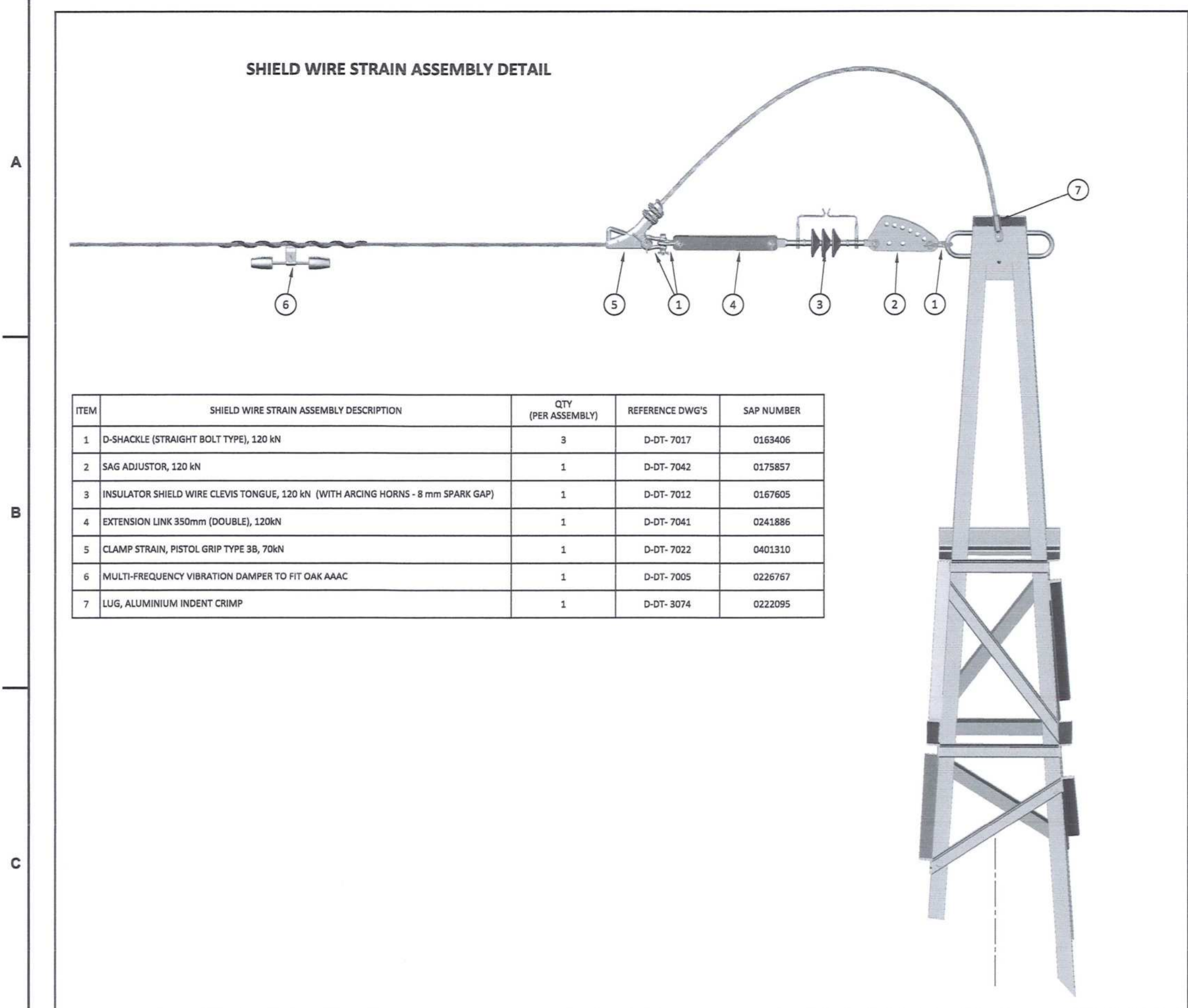
DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

#### REVISIONS

This document is the property of Transnet and is confidential. It is not to be distributed outside the organization without the written consent of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for the intended purpose.

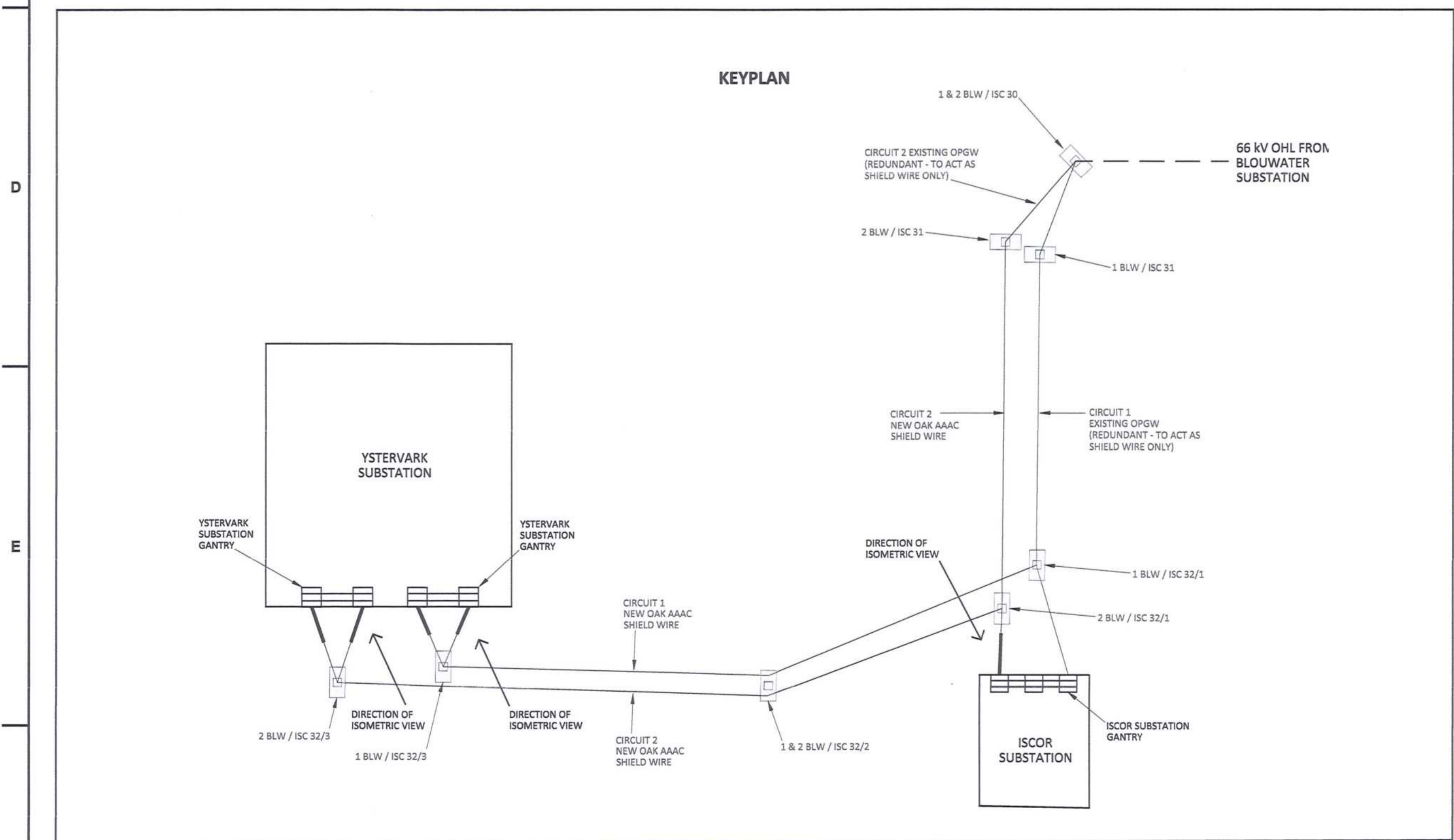
NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION	DD	BS	RS	2019-06-26

CONTRACTOR / CONSULTANT						TRANSNET CAPITAL PROJECTS					
TITLE	NAME	SRN	DATE	TITLE	NAME	SRN	DATE				
DRAWN	DD		19 09 25								
CHECKED	KS		19 09 25								
DESIGNED	WV		19 09 25								
CHECKED	BS		19 09 25								
OPERATING DIVISIONS											
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE				
PROJECT NUMBER: 19 09 25 REG. NUMBER: 50707 SCALE: N.T.S.								<b>TRANSNET CAPITAL PROJECTS</b> TABLE BAY BUILDING, TYGERBERG PARK, 163 OFF BRIDGE DRIVE, PLATTENBERG, 7601 TEL: 021 945 1699 FAX: 086 477 2465			
								<b>IRON ORE TIPPLER 3 PROJECT</b> <b>BULK POWER UPGRADE :</b> <b>66 kV BRANCH LINE MASTS - SUBSTATION GANTRY</b> <b>OPGW STRAIN AND TERMINATION CONFIGURATION</b>			
								PROJECT NUMBER: 19 09 25 SHEET: 4 OF: 4 DRAWING NO: 19 09 25			



THIS CONFIGURATION IS FOR THE SHIELD WIRE STRAIN ASSEMBLIES AT :

- ISCOR SUBSTATION GANTRY, CIRCUIT 2
- YSTERVARK SUBSTATION GANTRY, CIRCUIT 1
- YSTERVARK SUBSTATION GANTRY, CIRCUIT 2



SHIELD WIRE STRAIN CONFIGURATION AT GANTRY (ISOMETRIC VIEW)

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	BS	RS	2019-09-28

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD		19 08 28	PR. ENGR.	PR. ENGR.		19 08 28
CHECKED	KS		19 08 28	NAME			DATE
DESIGNED	WV		19 08 28	SIGNATURE			19 08 28
CHECKED	BS		19 08 28	REG. NUMBER	047007		
OPERATING DIVISIONS				SCALE: N.T.S.			

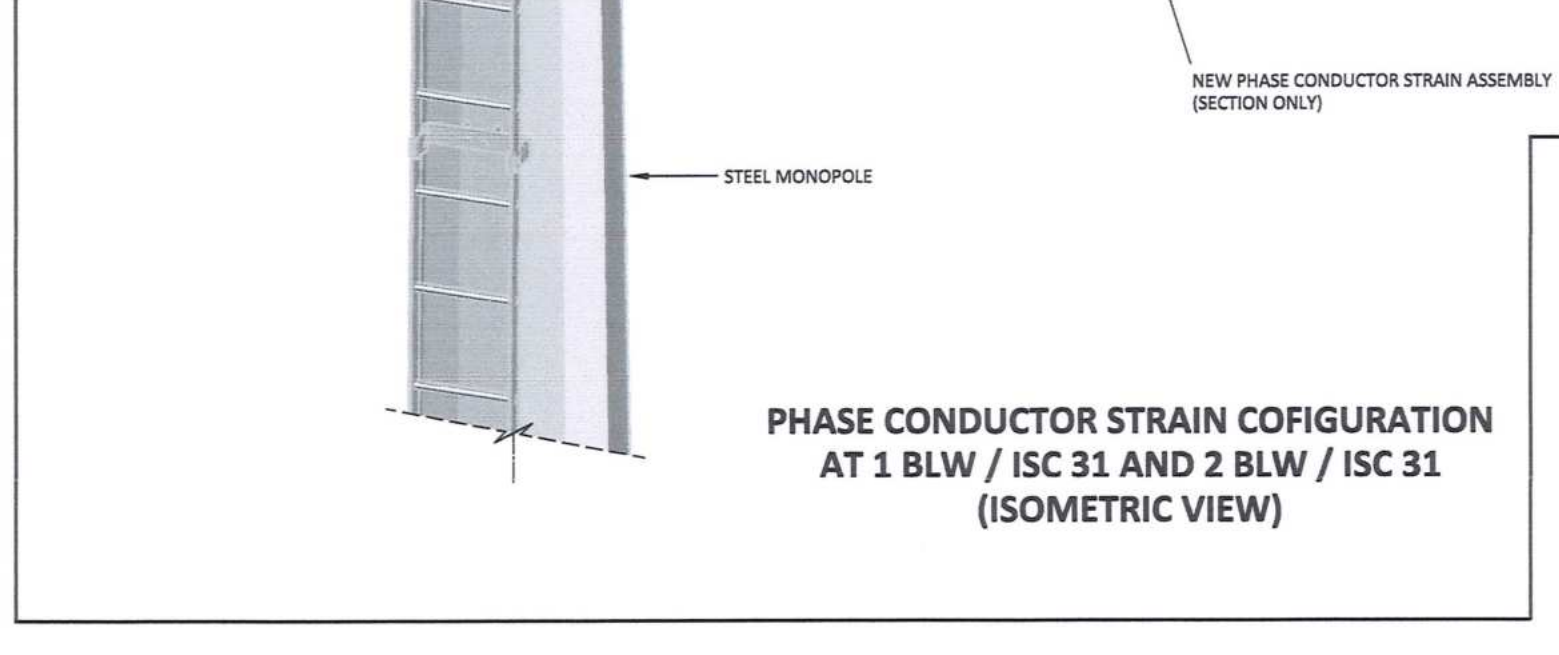
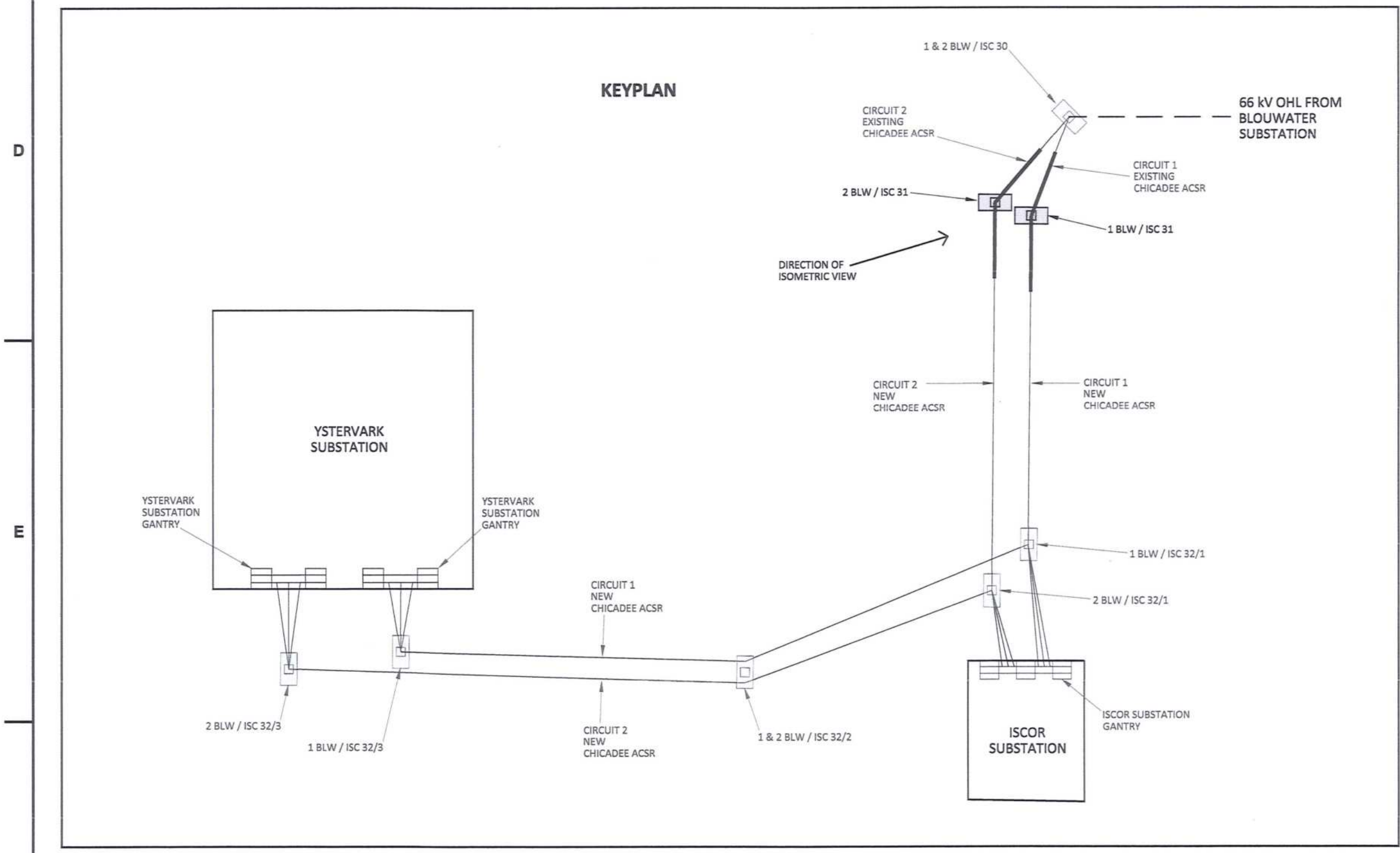
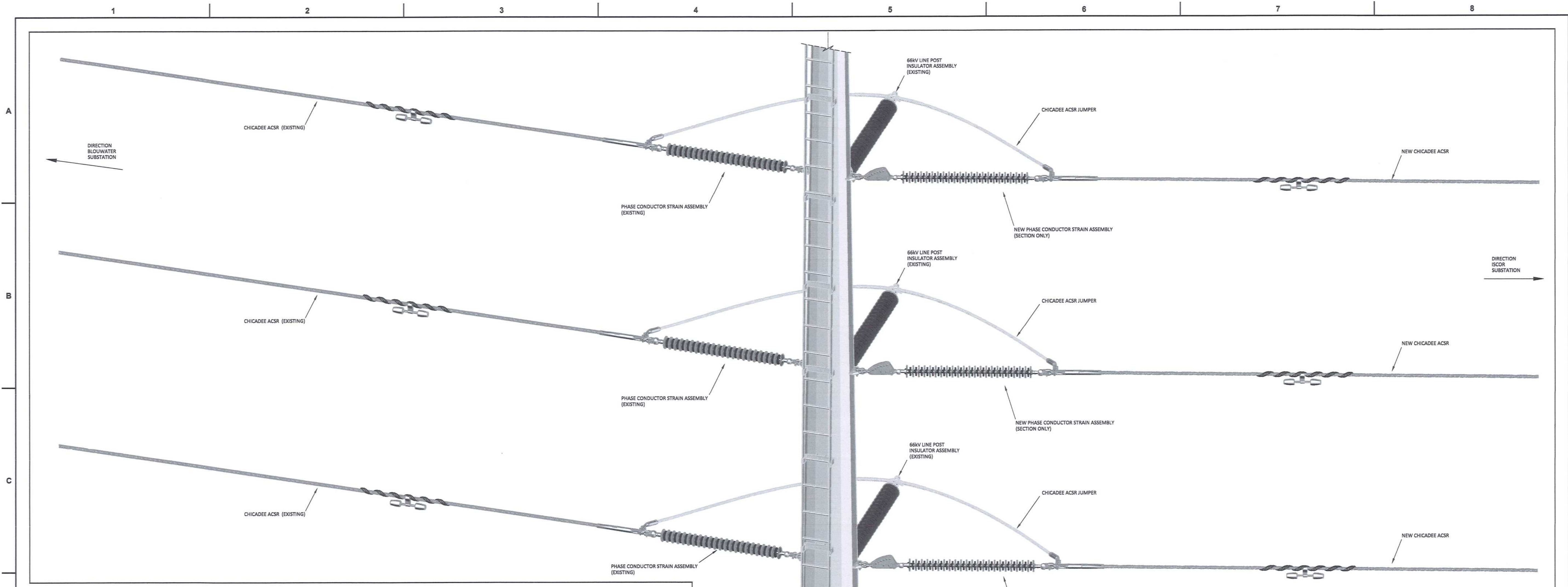
**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT**

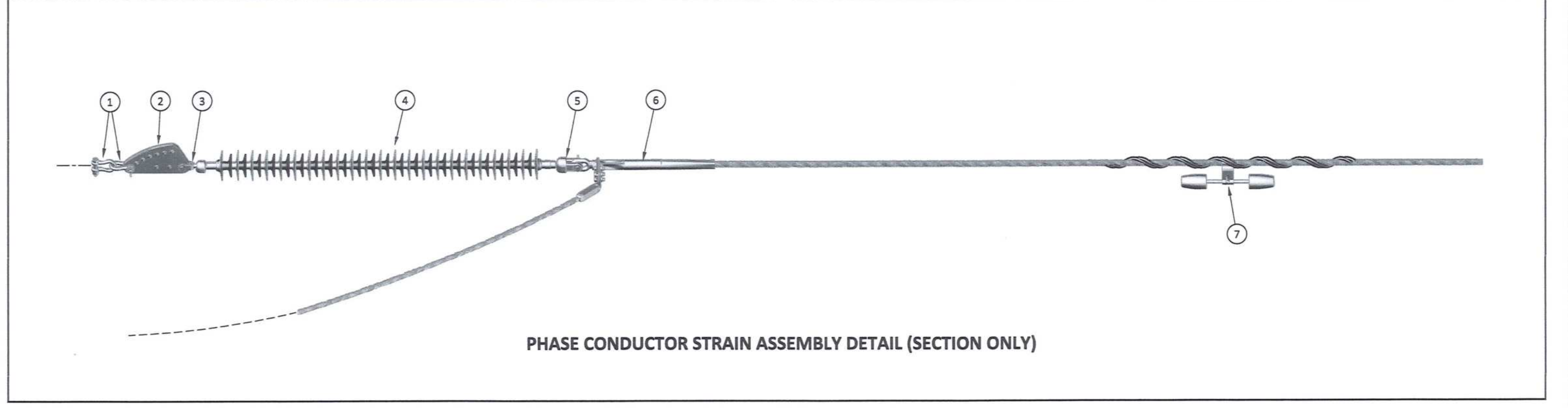
**BULK POWER UPGRADE :**

**66 KV BRANCH LINE STRAINS - SUBSTATION GANTRY SHIELD WIRE STRAIN CONFIGURATION (TYPICAL)**

PROJECT NUMBER: 19124710123100E0E0041510100AE



ITEM	PHASE CONDUCTOR STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	6	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	3	D-DT-7042	0175857
3	CLEVIS BALL, 120 kN	1	3	D-DT-6059	022125
4	INSULATOR (LONG ROD), 66kV, 31mm/kV, 120 kN	1	3	D-DT-7029	0167609
5	SOCKET CLEVIS, 120 kN	1	3	D-DT-7021	0010259
6	COMPRESSION DEAD END CLAMP ASSEMBLY	1	3	D-DT-7000	0168745
7	MULTI-FREQUENCY VIBRATION DAMPER TO FIT CHICADEE ACSR	1	3	D-DT-7005	0168960



DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

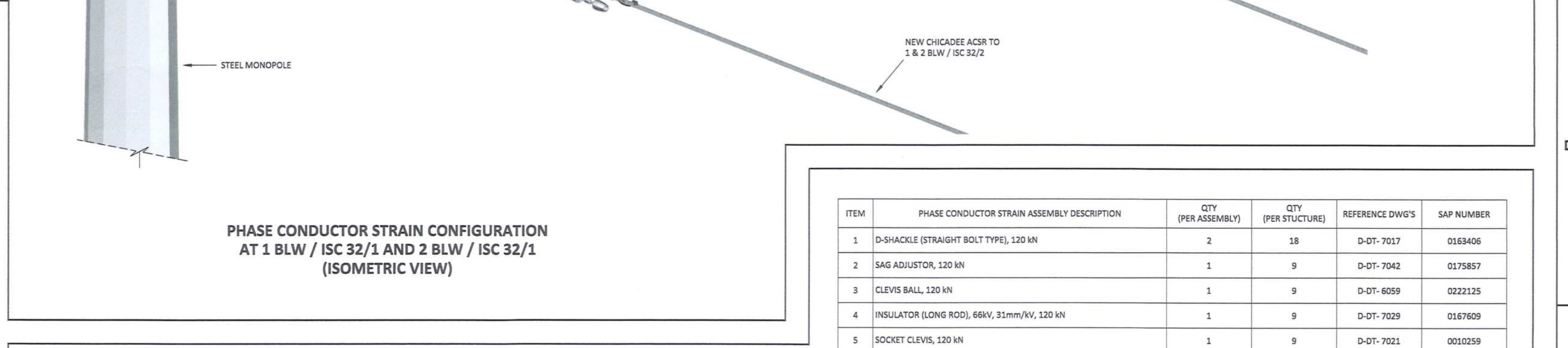
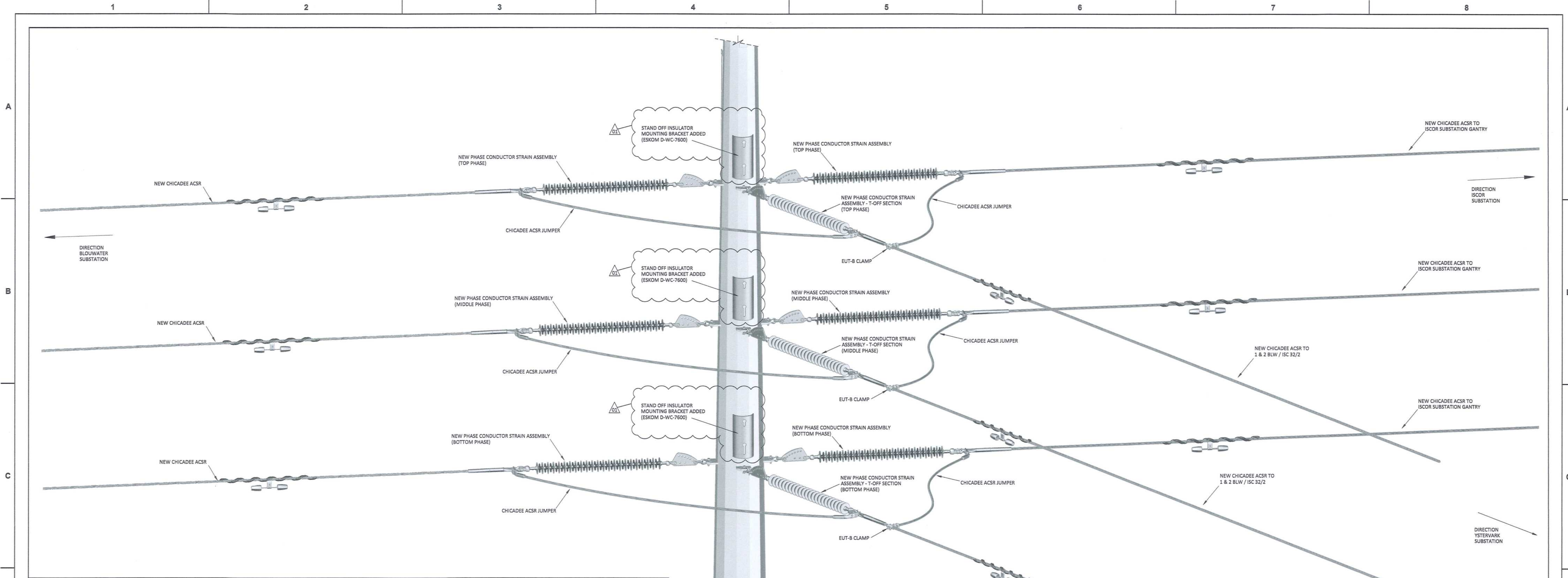
**NOTES**  
 1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
 2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DO		19 09 20				
CHECKED	KS		19 09 20				
DESIGNED	WV		19 09 20				
CHECKED	BS		19 09 20				
OPERATING DIVISIONS							
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				PRELIM / PROJECT ARCH	R. W. ...		19 09 20
REVISIONS							
NO.	DESCRIPTION	BY	CHKD	APPD	DATE		
00	ISSUED FOR CONSTRUCTION	DO	BS	RS	2019-09-20		

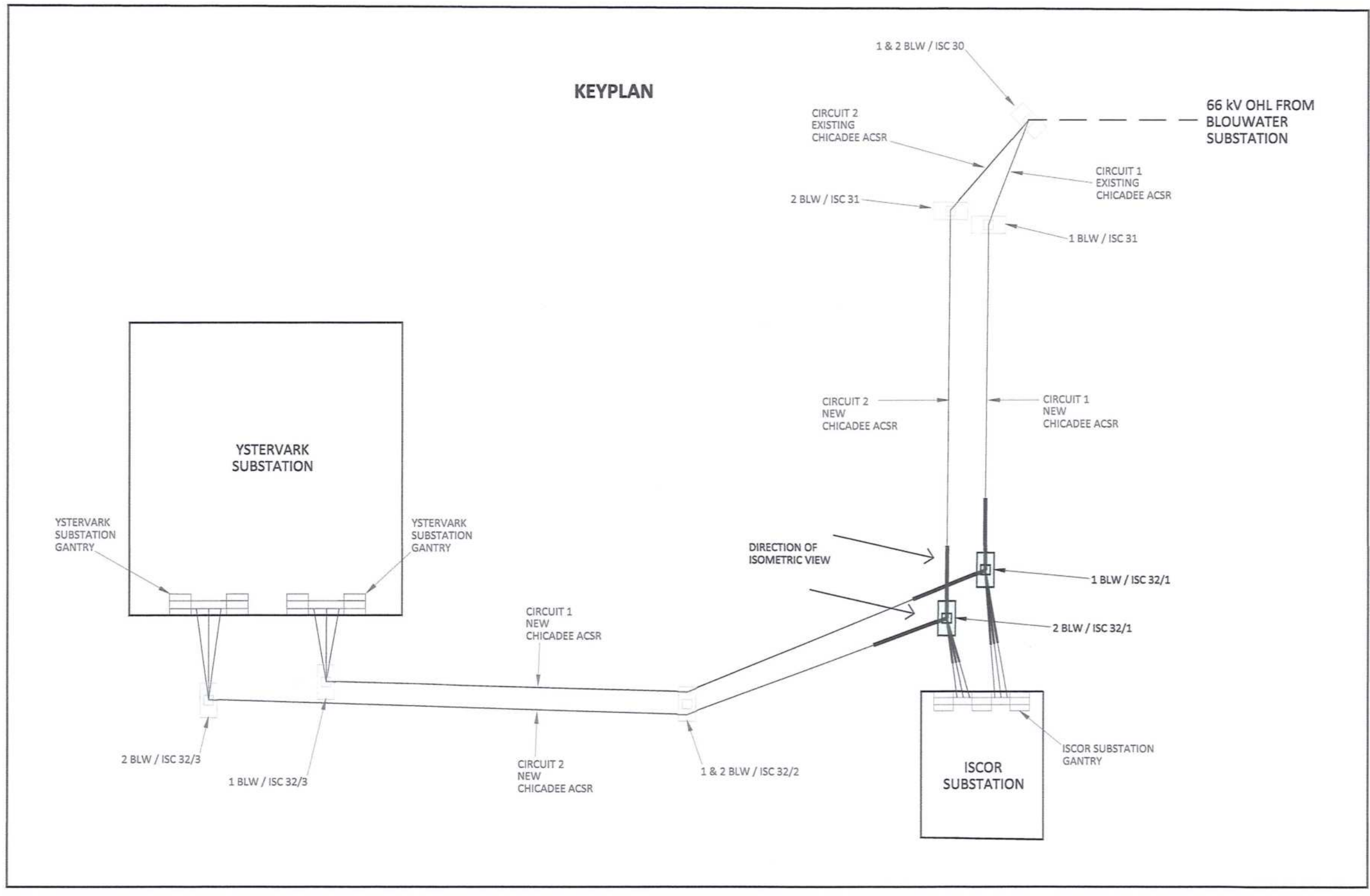
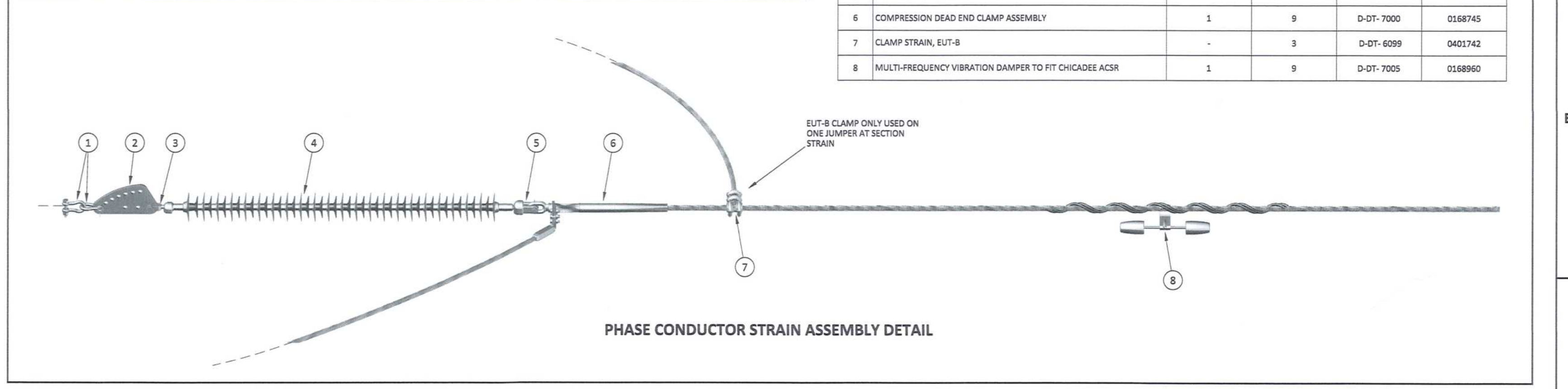
TRANSNET CAPITAL PROJECTS  
 TRANSNET LTD (INCORPORATED IN SOUTH AFRICA) PROJECTS DEPT. REG. NO. 199080806  
 TABLE BAY BUILDINGS, TYGEBERG PARK, 163 LIPS ROAD DRIVE, PLATTEKLIP  
 TEL: 021 940 1999 FAX: 021 940 2465

**PORT OF SALDANHA**  
 IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE :  
 66 kV BRANCH LINE MASTS -  
 1 BLW / ISC 31 AND 2 BLW / ISC 31  
 PHASE CONDUCTOR STRAIN CONFIGURATION

PROJECT NUMBER: 190247012300000E004601000A  
 SCALE: N.T.S.  
 DRAWING NO: 190247012300000E004601000A



ITEM	PHASE CONDUCTOR STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWGS	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	18	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	9	D-DT-7042	0175857
3	CLEVIS BALL, 120 kN	1	9	D-DT-6059	0222125
4	INSULATOR (LONG ROD), 66kV, 31mm/kV, 120 kN	1	9	D-DT-7029	0167609
5	SOCKET CLEVIS, 120 kN	1	9	D-DT-7021	0010259
6	COMPRESSION DEAD END CLAMP ASSEMBLY	1	9	D-DT-7000	0168745
7	CLAMP STRAIN, EUT-B	-	3	D-DT-6099	0401742
8	MULTI-FREQUENCY VIBRATION DAMPER TO FIT CHICADEE ACSR	1	9	D-DT-7005	0168960



**NOTES**  
 1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
 2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

MASTER  
21 NOV 2019  
ASCOM

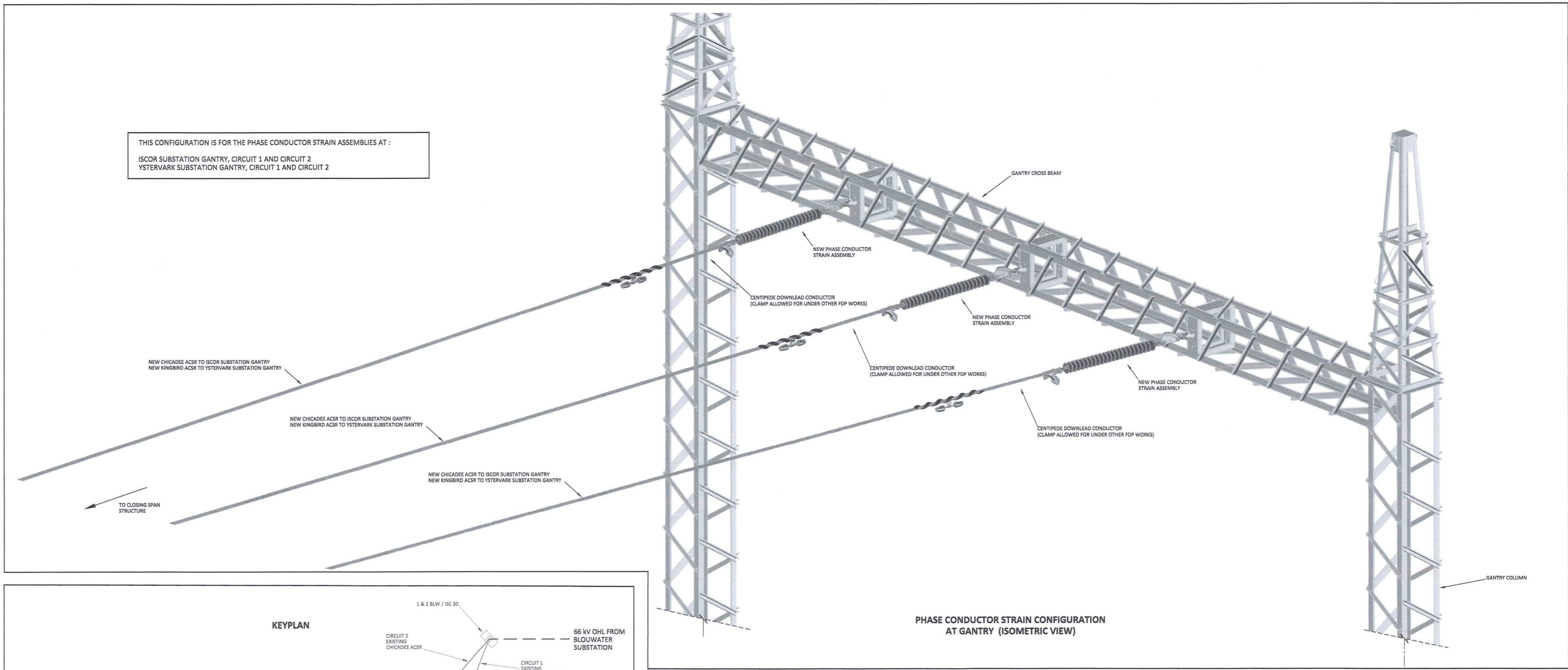
NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION REFER REV CLOUDS	DO	BS	RS	2019-11-21
02	ISSUED FOR CONSTRUCTION	DO	BS	RS	2019-09-26

CONTRACTOR / CONSULTANT				TRANSET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DO	[Signature]	19 11 21	PRE-ENG. / PR. TECH./PR. ARCH	C. PVM	[Signature]	19 11 21
CHECKED	KS	[Signature]	19 11 21	SIGNATURE	[Signature]	[Signature]	19 11 21
DESIGNED	WV	[Signature]	19 11 21	REG. NUMBER	20170126		
CHECKED	BS	[Signature]	19 11 21	SCALE	N.T.S.		

**PORT OF SALDANHA**  
 IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE:  
 66 kV BRANCH LINE MASTS -  
 1 BLW / ISC 32/1 AND 2 BLW / ISC 32/1  
 PHASE CONDUCTOR STRAIN CONFIGURATION

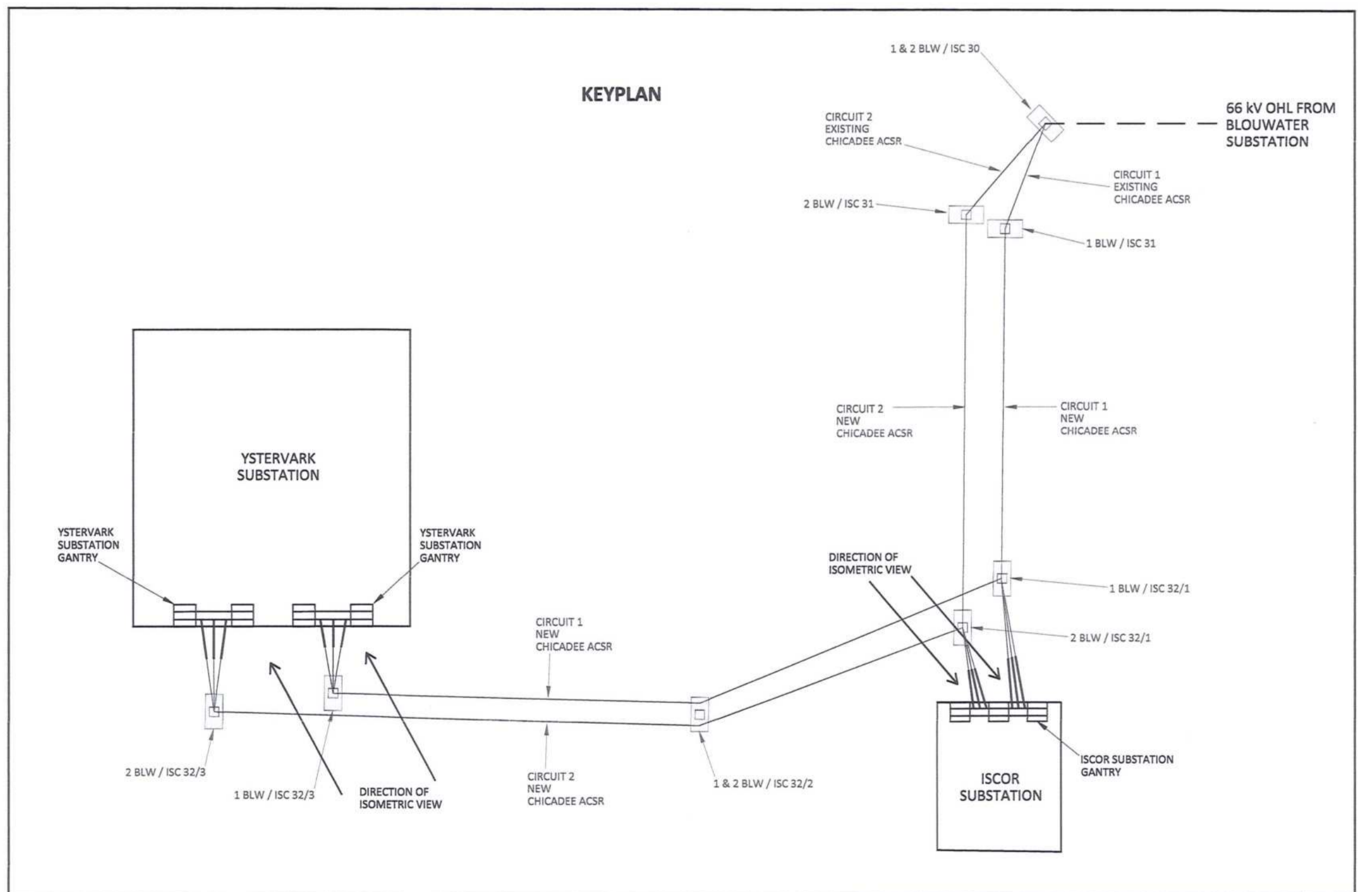
PROJECT NUMBER: 1919247011231010EHD10147011011AE  
 SHEET: 10 OF 10

THIS CONFIGURATION IS FOR THE PHASE CONDUCTOR STRAIN ASSEMBLIES AT :  
 ISCOR SUBSTATION GANTRY, CIRCUIT 1 AND CIRCUIT 2  
 YSTERVARK SUBSTATION GANTRY, CIRCUIT 1 AND CIRCUIT 2

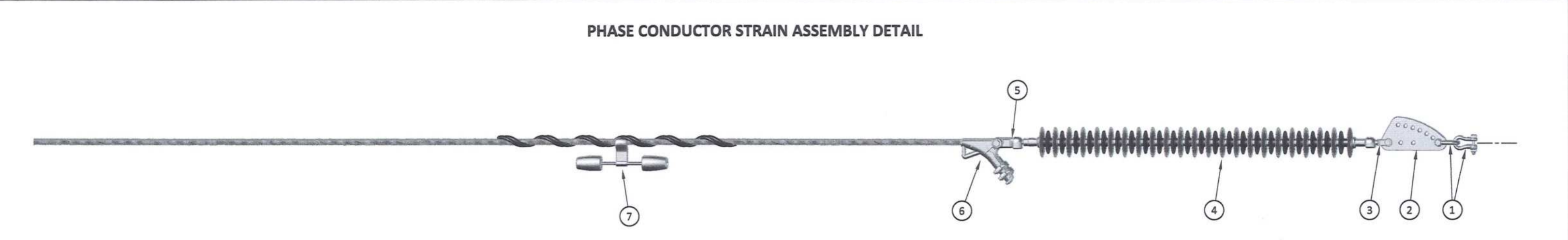


PHASE CONDUCTOR STRAIN CONFIGURATION AT GANTRY (ISOMETRIC VIEW)

KEYPLAN



PHASE CONDUCTOR STRAIN ASSEMBLY DETAIL



ISCOR SUBSTATION GANTRY

ITEM	PHASE CONDUCTOR STRAIN ASSEMBLY DESCRIPTION (FOR CHICADEE ACSR)	QTY (PER ASSEMBLY)	TOTAL QTY (AT GANTRY)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	6	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	3	D-DT-7042	0175857
3	CLEVIS BALL, 120 kN	1	3	D-DT-6059	0222125
4	INSULATOR (LONG ROD), 66kV, 31mm/AV, 120 kN	1	3	D-DT-7029	0167609
5	SOCKET CLEVIS, 120 kN	1	3	D-DT-7021	0010259
6	CLAMP STRAIN, PISTOL GRIP TYPE 3B	1	3	D-DT-7022	0243440
7	MULTI-FREQUENCY VIBRATION DAMPER TO FIT CHICADEE ACSR	1	3	D-DT-7005	0168960

YSTERVARK SUBSTATION GANTRY

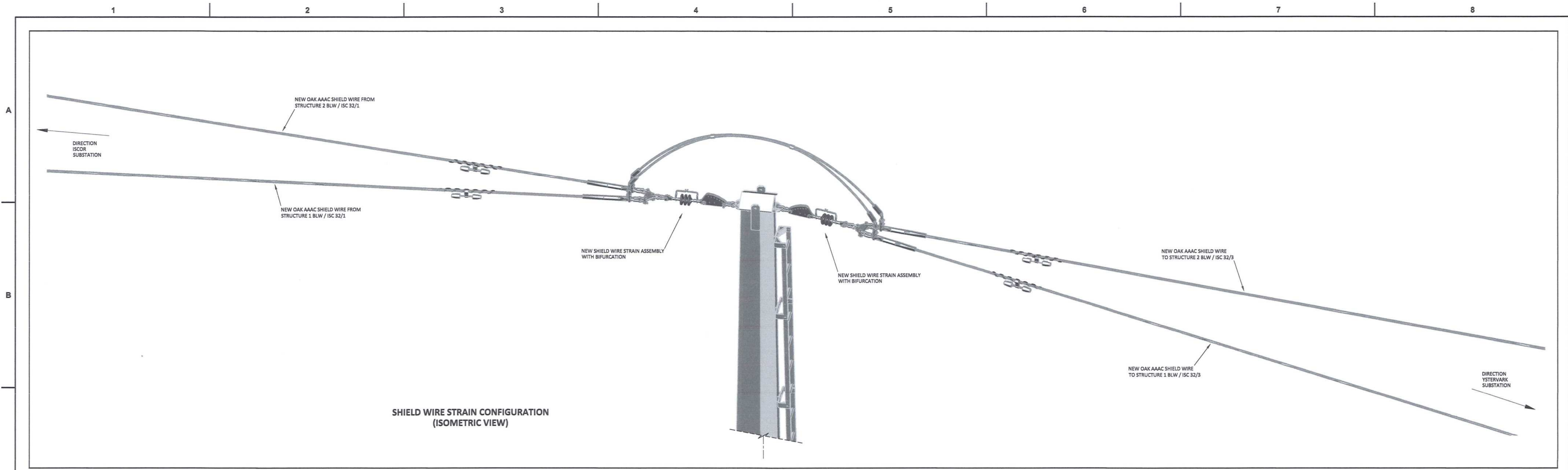
ITEM	PHASE CONDUCTOR STRAIN ASSEMBLY DESCRIPTION (FOR KINGBIRD ACSR)	QTY (PER ASSEMBLY)	TOTAL QTY (AT GANTRY)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	6	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	3	D-DT-7042	0175857
3	CLEVIS BALL, 120 kN	1	3	D-DT-6059	0222125
4	INSULATOR (LONG ROD), 132kV, 31mm/AV, 120 kN	1	3	D-DT-7014	0167607
5	SOCKET CLEVIS, 120 kN	1	3	D-DT-7021	0010259
6	CLAMP STRAIN, PISTOL GRIP TYPE 3B	1	3	D-DT-7022	0243440
7	MULTI-FREQUENCY VIBRATION DAMPER TO FIT KINGBIRD ACSR	1	3	D-DT-7005	0168893

NOTES

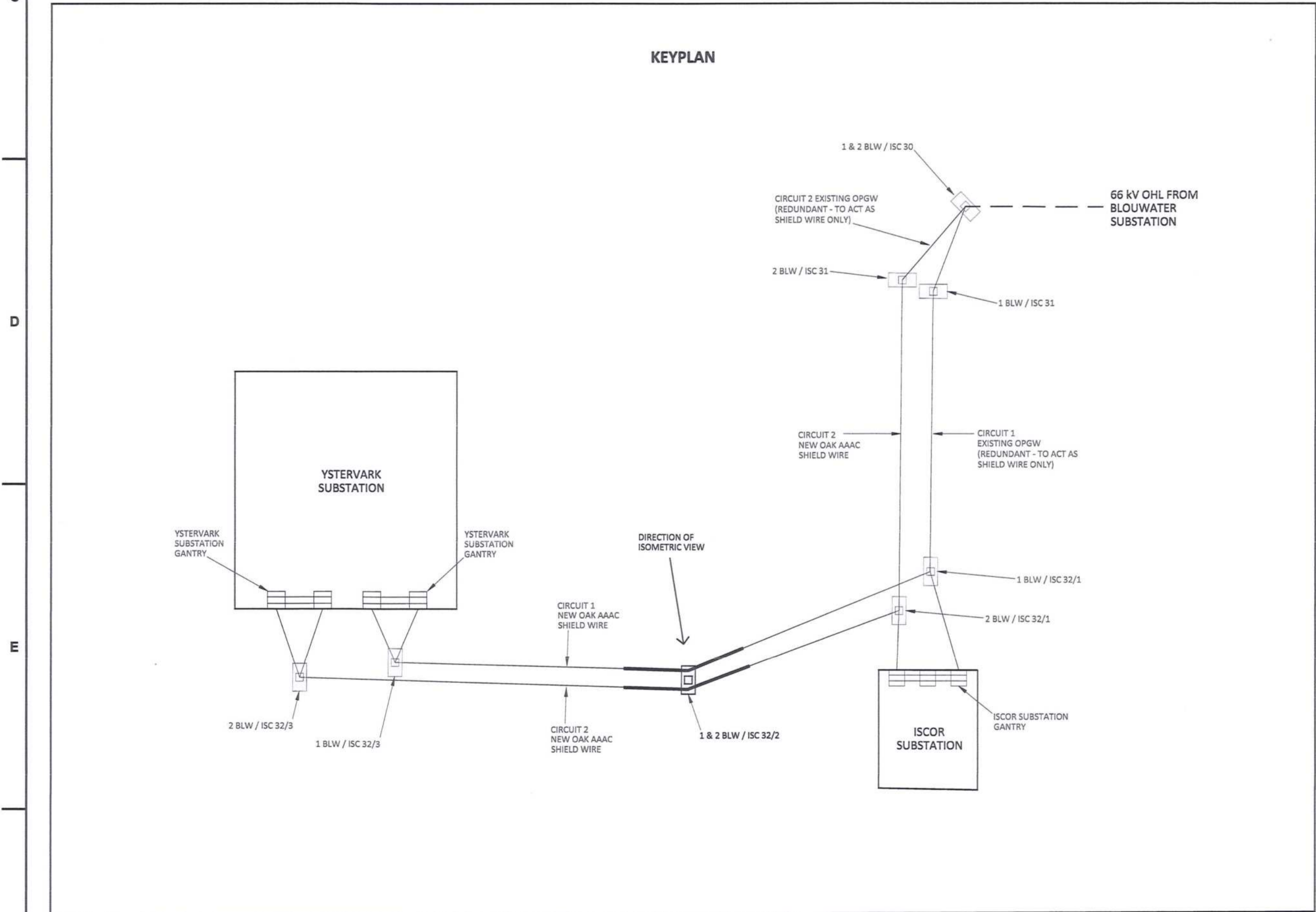
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

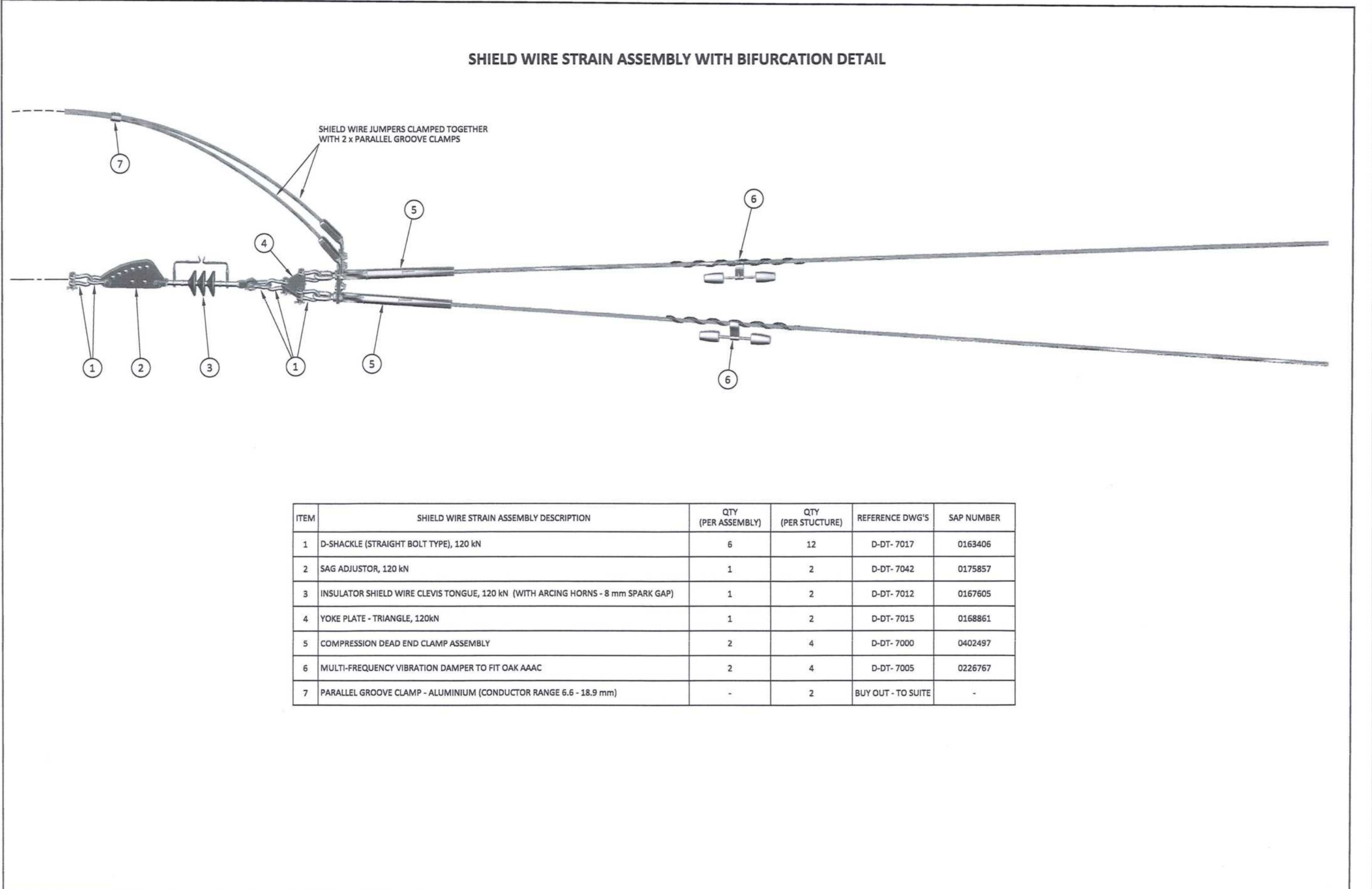
CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	RS	2019-09-26	PRELIM. I/P	RS	DD	2019-09-26
CHECKED	KS	RS	19 09 26	NAME	RS	DD	2019-09-26
DESIGNED	WV	RS	19 09 26	SIGNATURE	DD	RS	2019-09-26
CHECKED	BS	RS	19 09 26	REG. NUMBER	547077		
OPERATING DIVISIONS				SCALE: N.T.S.			
00 ISSUED FOR CONSTRUCTION				PROJECT NUMBER: 19024701123010E048010100AE			
NO. DESCRIPTION				BY: CHKD APPD DATE			
REVISIONS				PROJECT NAME: IRON ORE TIPPLER 3 PROJECT BULK POWER UPGRADE - 66 kV BRANCH LINE MASTS - SUBSTATION GANTRY PHASE CONDUCTOR STRAIN CONFIGURATION (TYPICAL)			
This document including all design and drawings is the confidential intellectual property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.							



SHIELD WIRE STRAIN CONFIGURATION (ISOMETRIC VIEW)



KEYPLAN



SHIELD WIRE STRAIN ASSEMBLY WITH BIFURCATION DETAIL

ITEM	SHIELD WIRE STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	6	12	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	2	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN (WITH ARCING HORNS - 8 mm SPARK GAP)	1	2	D-DT-7012	0167605
4	YOKE PLATE - TRIANGLE, 120kN	1	2	D-DT-7015	0168861
5	COMPRESSION DEAD END CLAMP ASSEMBLY	2	4	D-DT-7000	0402497
6	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OAK AAAC	2	4	D-DT-7005	0226767
7	PARALLEL GROOVE CLAMP - ALUMINIUM (CONDUCTOR RANGE 6.6 - 18.9 mm)	-	2	BUY OUT - TO SUITE	-

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**  
 1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
 2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	BS	RS	2019-09-26

CONTRACTOR / CONSULTANT				TRANSET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	[Signature]	19 09 26	NAME	PRENG	[Signature]	19 09 26
CHECKED	KS	[Signature]	19 09 26	DATE			
CHECKED	WV	[Signature]	19 09 26				
CHECKED	BS	[Signature]	19 09 26				

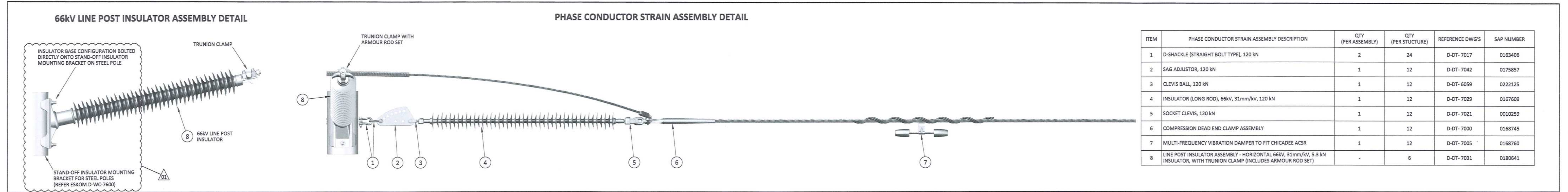
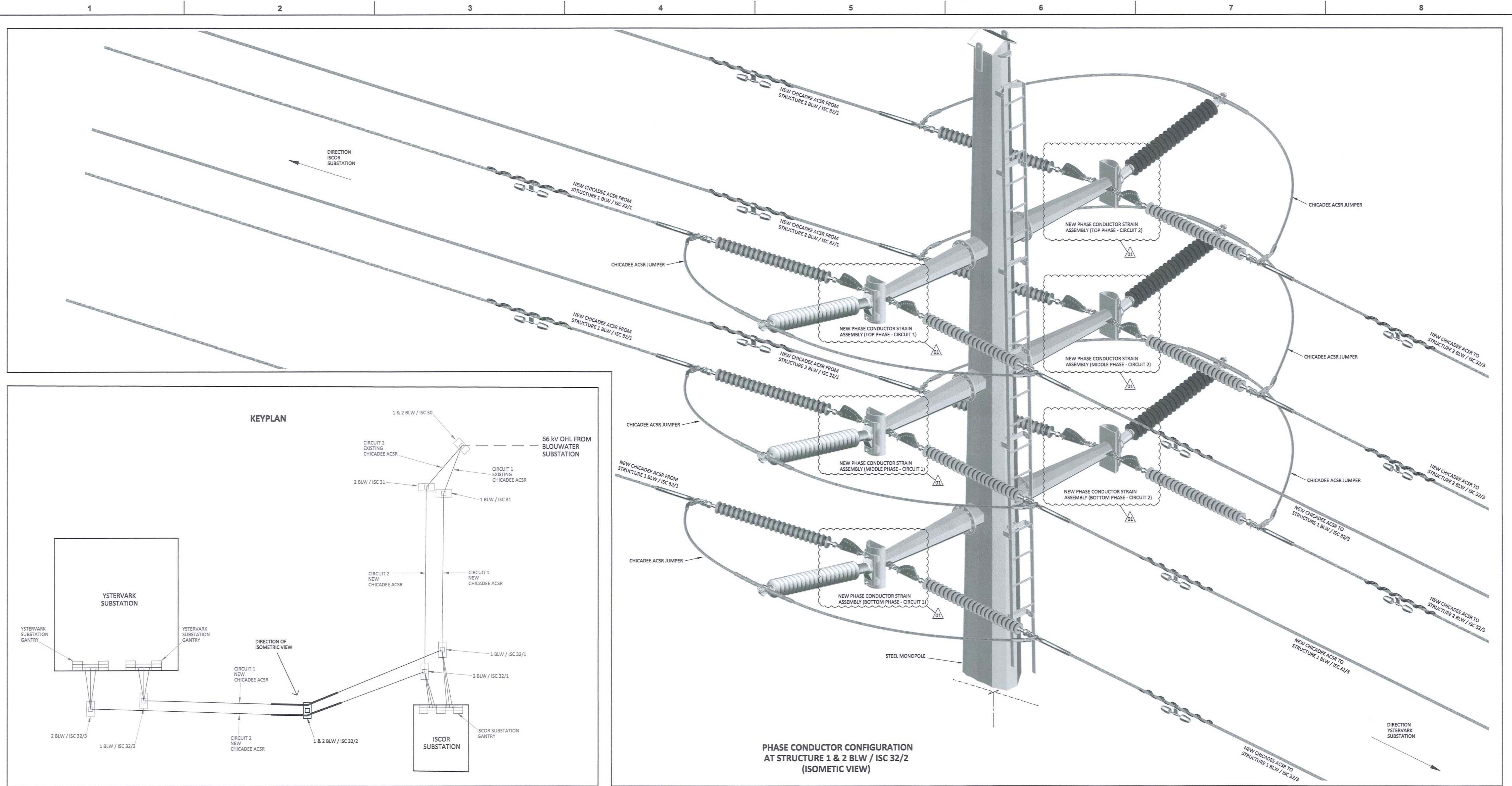
REG. NUMBER	SCALE	PROJECT NUMBER	SHEET	REV	ID
947007	N.T.S.	1912471012310049101010	04	01	010

Transnet Capital Projects  
 TABLE BAY BUILDING, TYGERBERG PARK  
 162 LIVE WIRE DRIVE, PLATTEKLOOF  
 TEL: 021 940 1999  
 FAX: 021 947 2455

**PORT OF SALDANHA**

IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE :  
 66 KV BRANCH LINE MASTS - 1 & 2 BLW / ISC 32/2  
 SHIELD WIRE STRAIN CONFIGURATION





ITEM	PHASE CONDUCTOR STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	24	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	12	D-DT-7042	0175857
3	CLEVIS BALL, 120 kN	1	12	D-DT-6059	0222125
4	INSULATOR (LONG ROD), 66kV, 31mm/kV, 120 kN	1	12	D-DT-7029	0167609
5	SOCKET CLEVIS, 120 kN	1	12	D-DT-7021	0010259
6	COMPRESSION DEAD END CLAMP ASSEMBLY	1	12	D-DT-7000	0168745
7	MULTI-FREQUENCY VIBRATION DAMPER TO FIT CHICADEE ACSR	1	12	D-DT-7005	0168760
8	LINE POST INSULATOR ASSEMBLY - HORIZONTAL 66kV, 31mm/kV, 5.3 kN INSULATOR, WITH TRUNION CLAMP (INCLUDES ARMOUR ROD SET)	-	6	D-DT-7031	0180641

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**  
 1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
 2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

MASTER  
 11 NOV 2019  
 AECOM

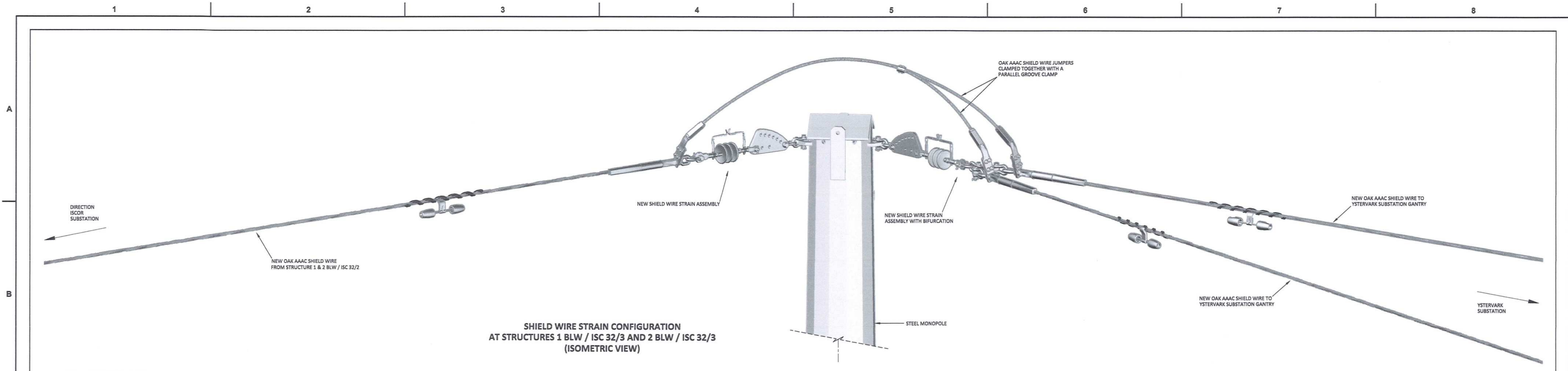
NO.	DESCRIPTION	DD	BS	RS	DATE
01	ISSUED FOR CONSTRUCTION	DD	BS	RS	2019-11-08
02	HORIZONTAL POST INSULATOR INTERFACE MOUNTING BRACKET REMOVED	DD	BS	RS	2019-09-26

CONTRACTOR / CONSULTANT			TRANSET CAPITAL PROJECTS		
NAME	SIGN	DATE	NAME	SIGN	DATE
DD	BS	RS	DD	BS	RS

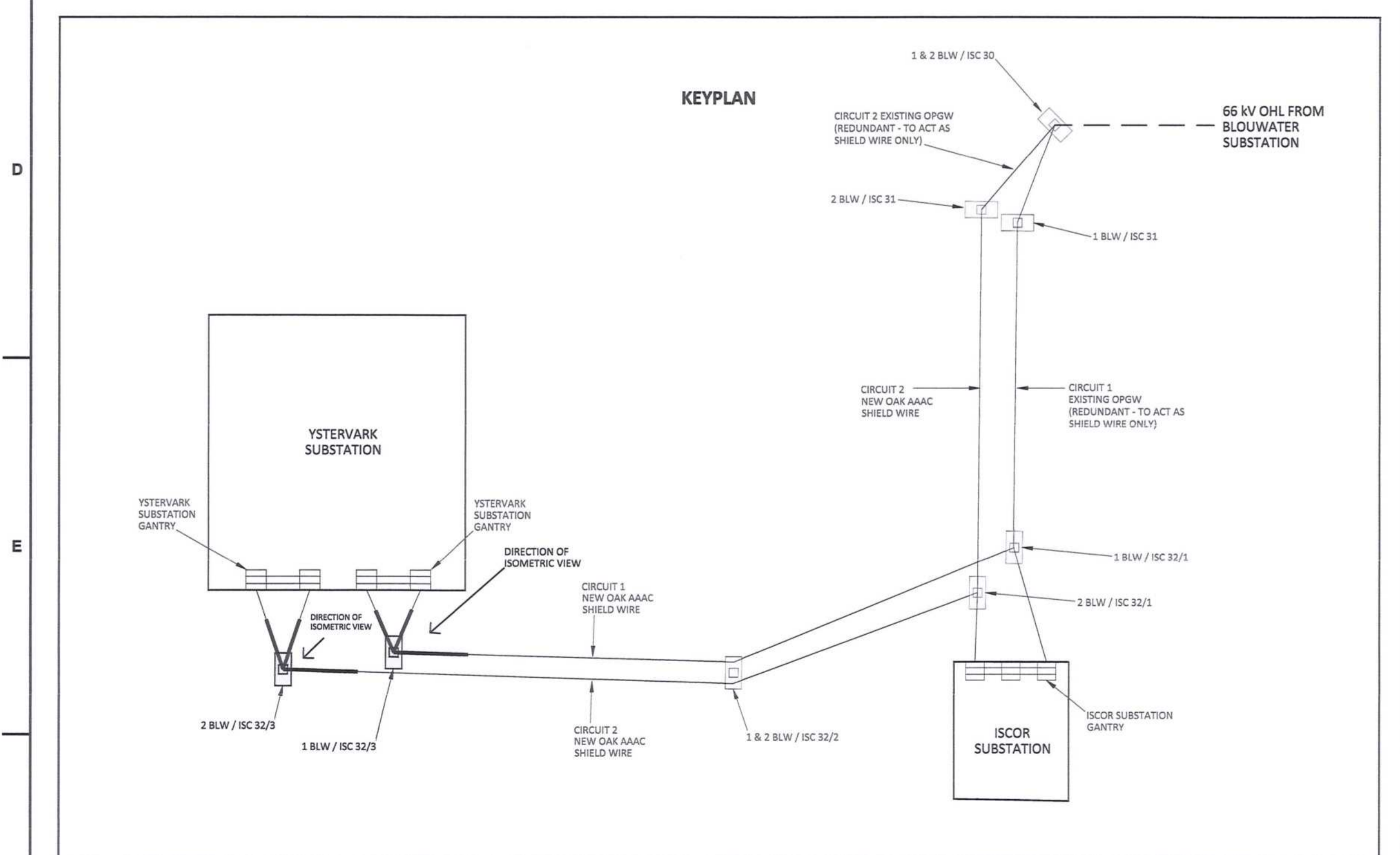
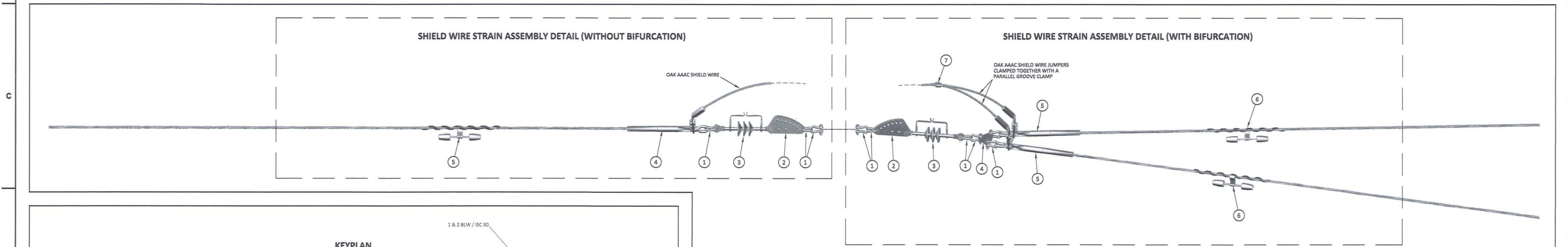
Transnet Capital Projects  
 163 LYS KRIGE DRIVE, PLATTENKOP, 8001  
 TEL: 021 940 1989  
 FAX: 021 940 2455

**PORT OF SALDANHA**  
 IRON ORE TIPLER 3 PROJECT  
 BULK POWER UPGRADE:  
 66 kV BRANCH MASTS - 1 & 2 BLW / ISC 32/2  
 PHASE CONDUCTOR STRAIN CONFIGURATION

PROJECT NUMBER: 192470123010  
 DIS: 0105010101  
 SHEET: 101  
 REV: 01  
 ID: AE



SHIELD WIRE STRAIN CONFIGURATION AT STRUCTURES 1 BLW / ISC 32/3 AND 2 BLW / ISC 32/3 (ISOMETRIC VIEW)



ITEM	SHIELD WIRE STRAIN ASSEMBLY DESCRIPTION (WITHOUT BIFURCATION)	QTY (PER ASSEMBLY)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	3	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN (WITH ARCING HORNS - 8 mm SPARK GAP)	1	D-DT-7012	0167605
4	COMPRESSION DEAD END CLAMP ASSEMBLY	1	D-DT-7000	0402497
5	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OAK AAAC	1	D-DT-7005	0226767

ITEM	SHIELD WIRE STRAIN ASSEMBLY DESCRIPTION (WITH BIFURCATION)	QTY (PER ASSEMBLY)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	6	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN (WITH ARCING HORNS - 8 mm SPARK GAP)	1	D-DT-7012	0167605
4	YOKE PLATE - TRIANGLE, 120kN	1	D-DT-7015	0168861
5	COMPRESSION DEAD END CLAMP ASSEMBLY	2	D-DT-7000	0402497
6	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OAK AAAC	2	D-DT-7005	0226767
7	PARALLEL GROOVE CLAMP - ALUMINIUM (CONDUCTOR RANGE 6.6 - 18.9 mm)	1	BUY OUT - TO SUITE	-

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**  
 1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
 2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	BS	RS	2019-09-26

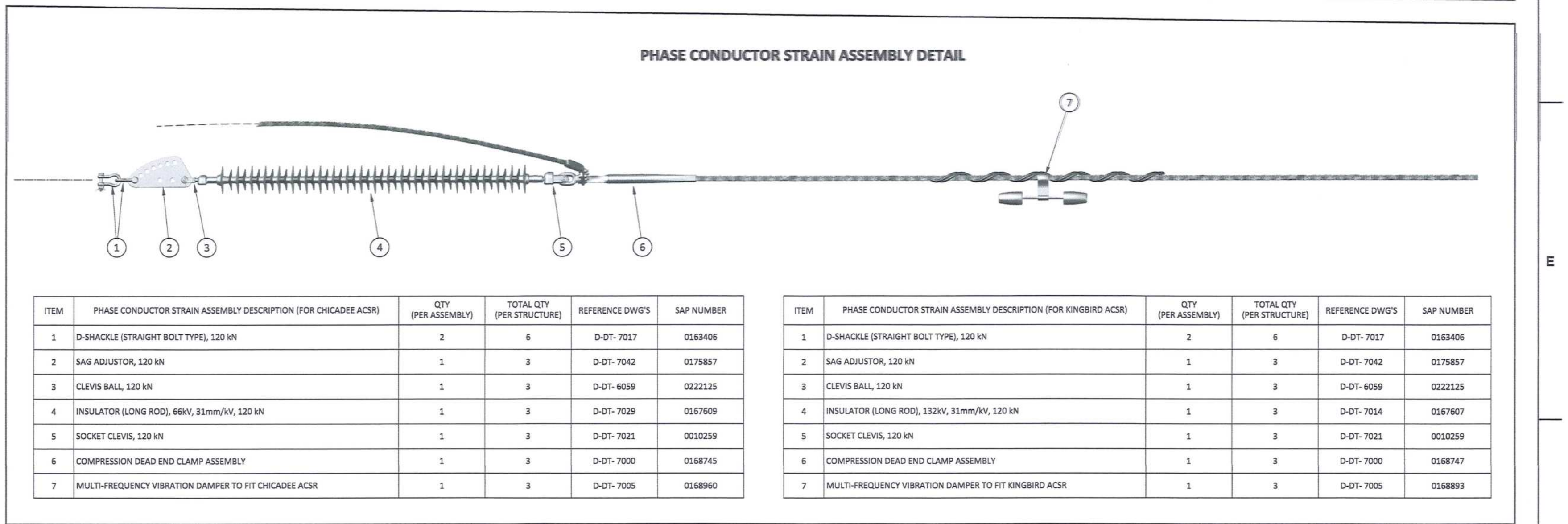
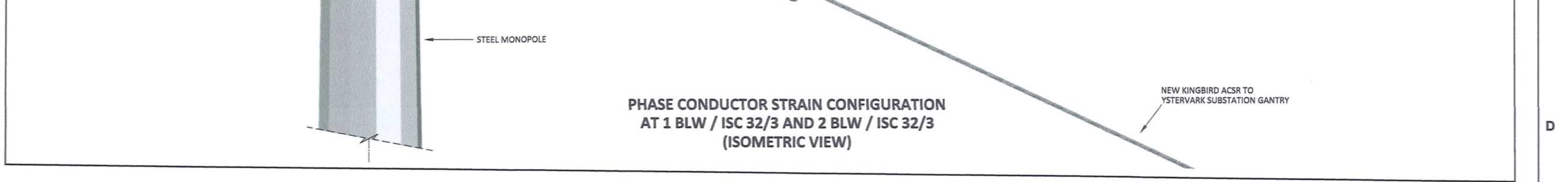
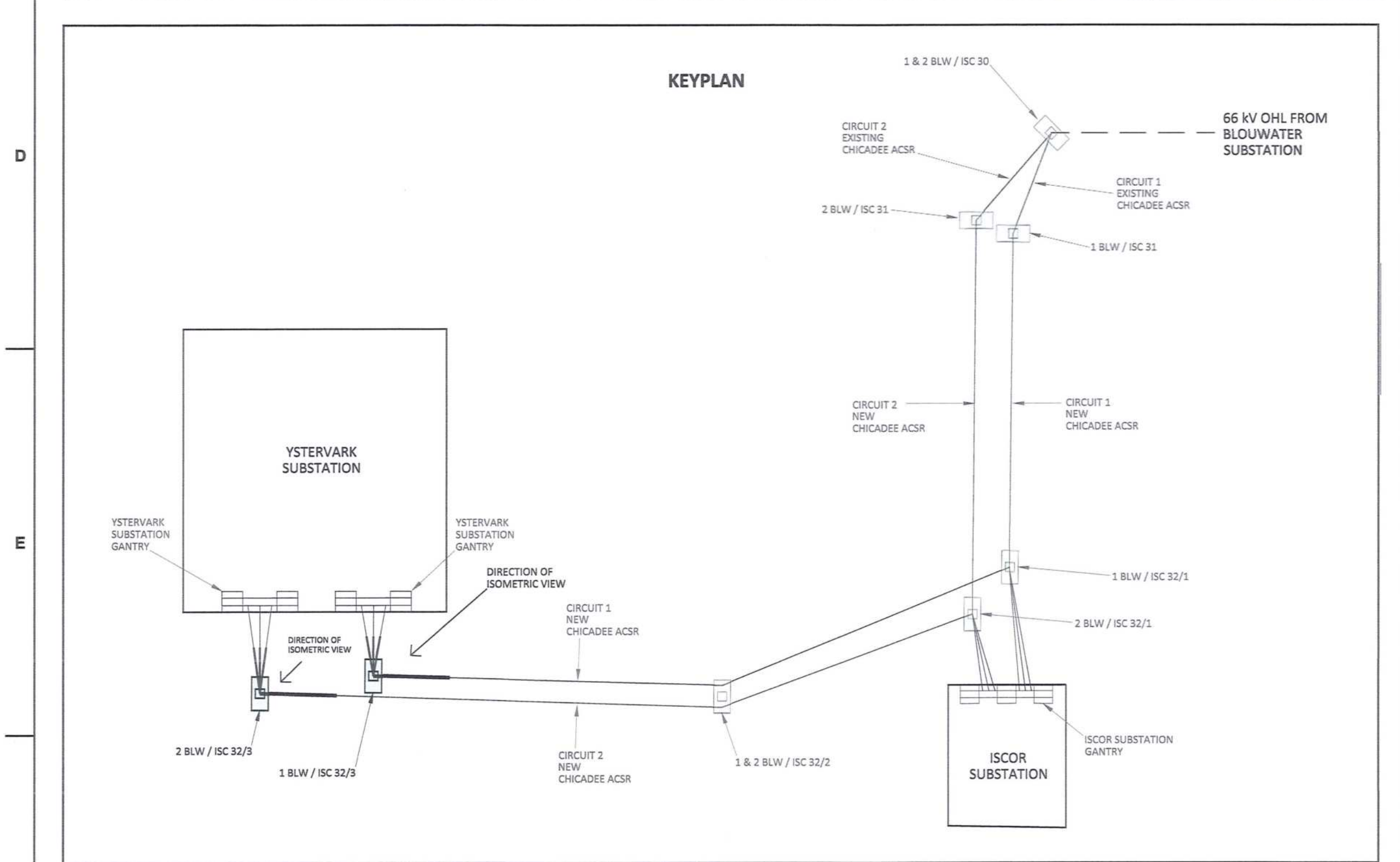
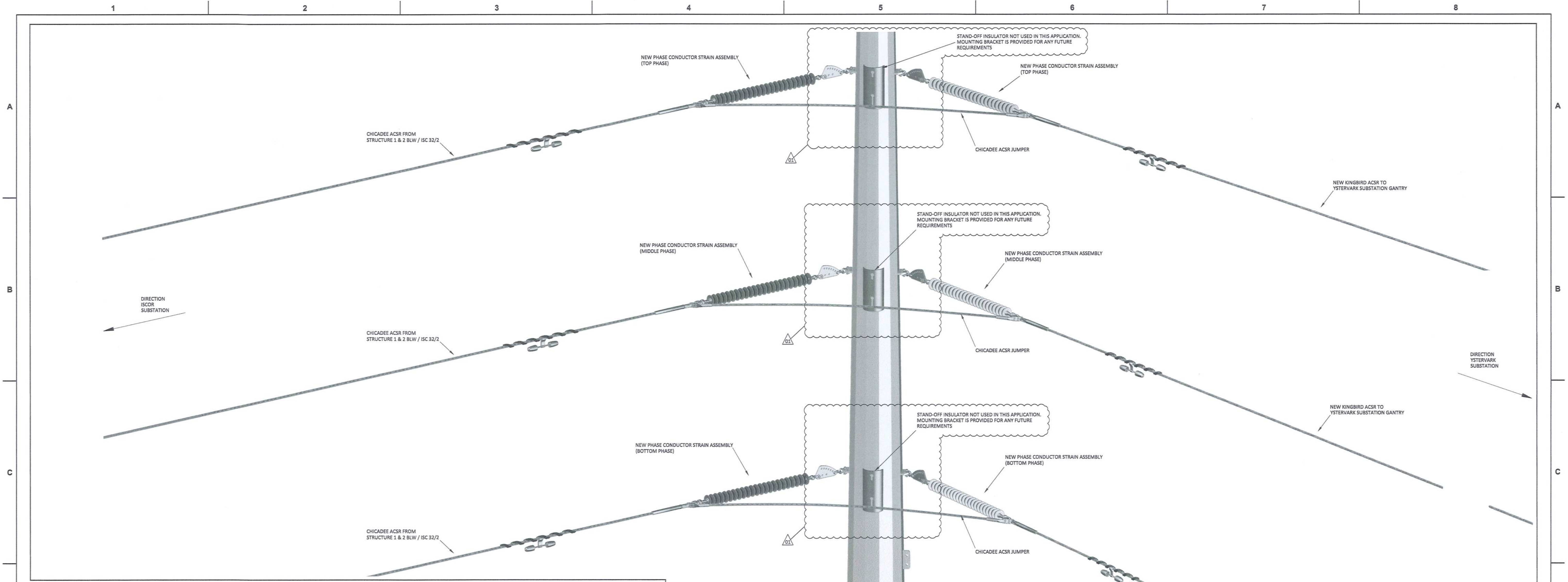
CONTRACTOR / CONSULTANT				TRANSMET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD		19 09 26				
CHECKED	KS		19 09 26				
DESIGNED	WJ		19 09 26				
CHECKED	BS		19 09 26				

OPERATING DIVISIONS	
TITLE	NAME

Transnet Capital Projects  
 TABLE BAY BUILDING, YSTERVARK PARK  
 163 LITE HOUSE DRIVE, PLATTEKLOOF  
 TEL: 021 940 1999  
 FAX: 021 940 2425

**PORT OF SALDANHA**  
 IRON ORE TIPLER 3 PROJECT  
 BULK POWER UPGRADE :  
 66 kV BRANCH LINE MASTS -  
 1 BLW / ISC 32/3 AND 2 BLW / ISC 32/3  
 SHIELD WIRE STRAIN CONFIGURATION

PR.ENG. / PR.TECH. / PR.ARCH  
 NAME: R. N. N. DATE: 19 09 26  
 SIGNATURE: [Signature] DATE: 19 09 26  
 REG. NUMBER: 947077  
 SCALE: N.T.S.  
 PROJECT NUMBER: 191247012300E0E00510100AE



DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

**MASTER**  
11 NOV 2018

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
NAME	DATE	NAME	DATE
DD	19 11 08	PR.ENG. / PR.TECH./PR. ARCH	
KS	19 11 08	NAME	C. PIV
WV	19 11 08	DATE	
BS	19 11 08	REG. NUMBER	21/01/08
		SCALE	N.T.S.

OPERATING DIVISIONS	
NAME	DATE

REVISIONS	
NO.	DESCRIPTION
01	ISSUED FOR CONSTRUCTION. STAND-OFF INSULATOR MOUNTING BRACKET REPLACED WITH CURVED TYPE (ESKOM D-WC-7800)
00	ISSUED FOR CONSTRUCTION

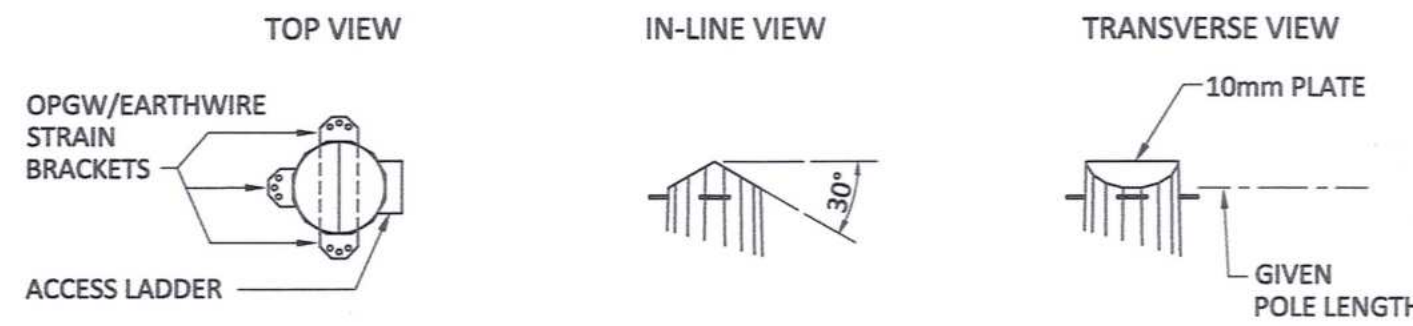
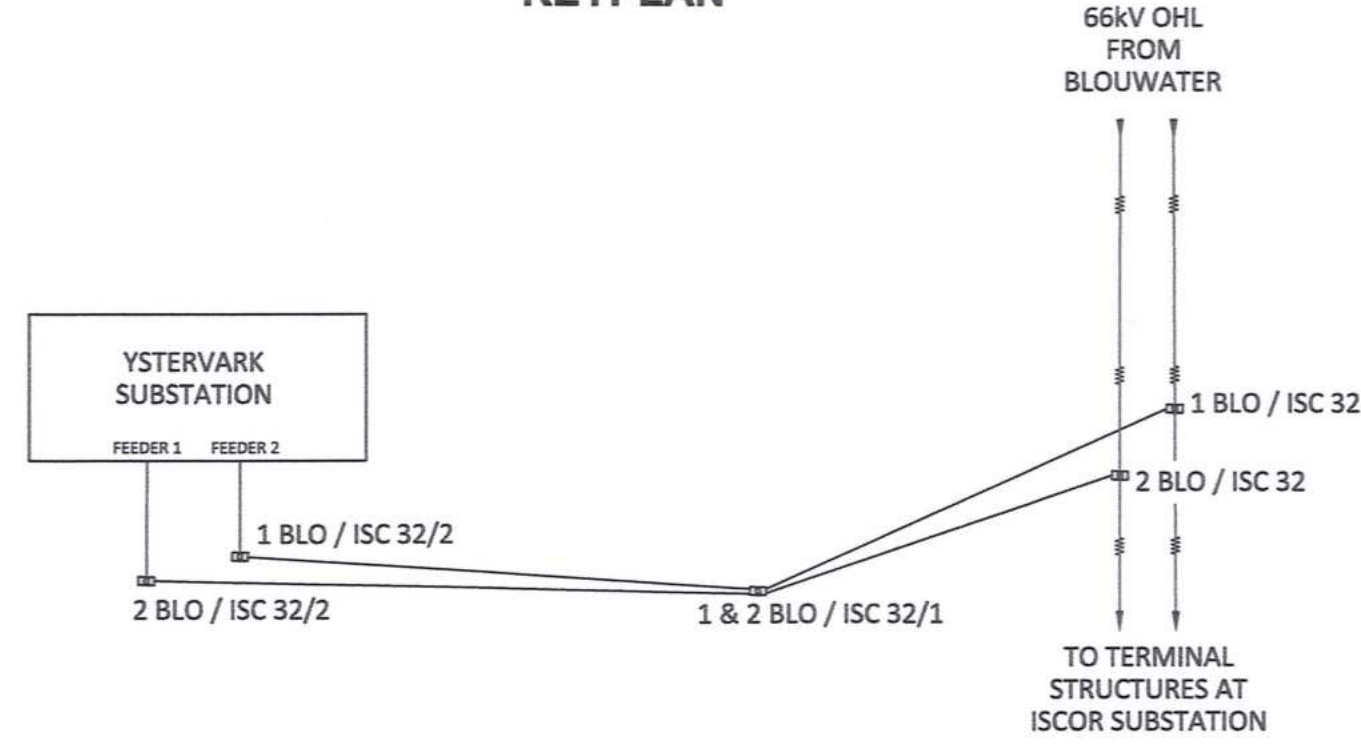
This document including all design and construction items is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701230	0	0	0	E	0162	01	01	AE

**TRANSNET CAPITAL PROJECTS**

Transnet Capital Projects  
 PORT OF SALDANHA  
 IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE -  
 66 kV BRANCH LINE MASTS -  
 1 BLW / ISC 32/3 AND 2 BLW / ISC 32/3  
 PHASE CONDUCTOR STRAIN CONFIGURATION

**KEYPLAN**



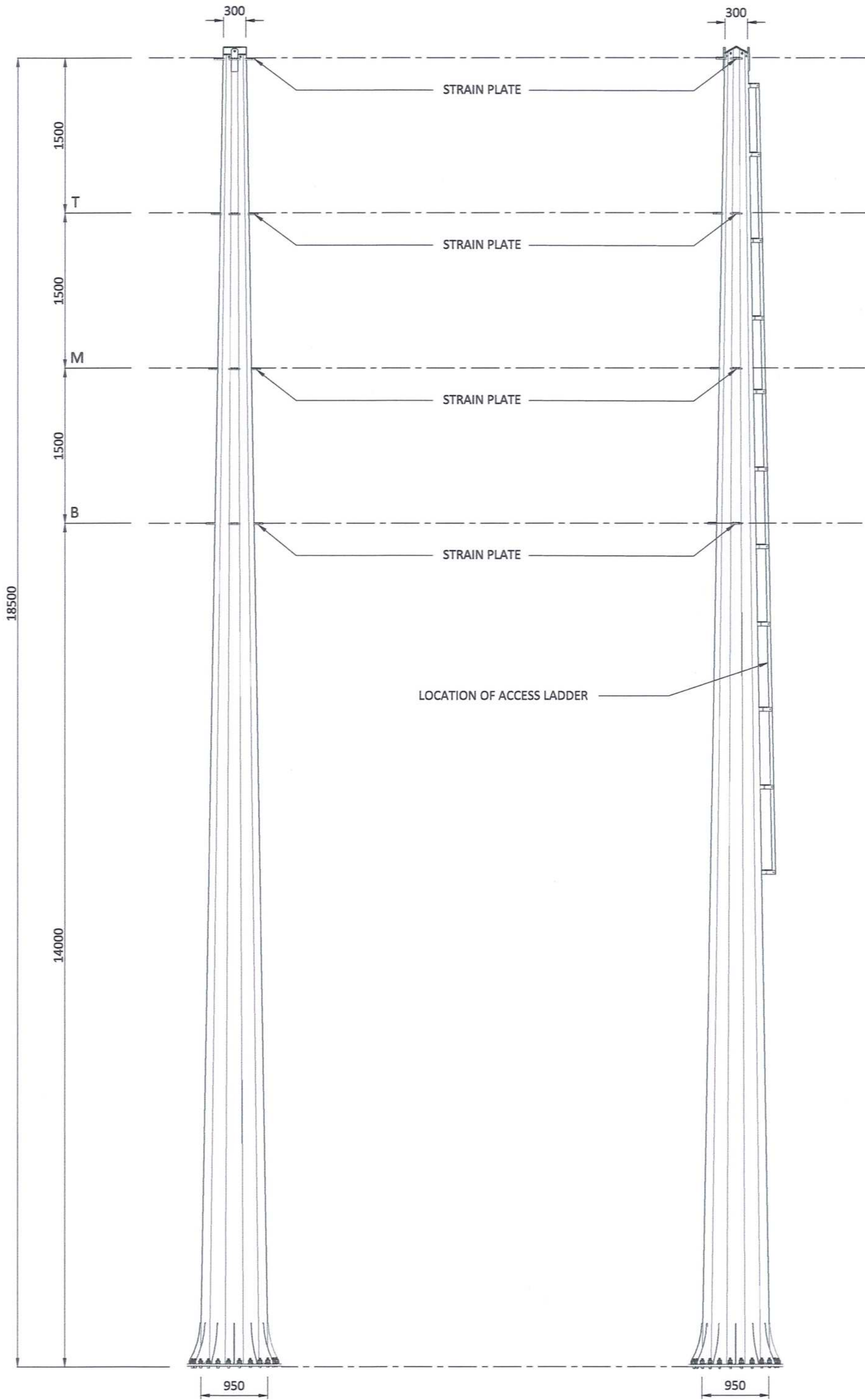
**DETAILS AT TOP OF POLE**

**SINGLE CIRCUIT T-OFF STRUCTURE, 14m CAH**

MAST NUMBER	1 BLO / ISC 32
PHASE CONDUCTOR : TYPE 1	CHICADEE ACSR
OPGW CONDUCTOR	EXISTING OPGW
SHIELD CONDUCTOR	OAK AAAC
VERTICAL $\phi - \phi$ SPACING (m)	1.50
VERTICAL $\epsilon - \phi$ SPACING (m)	1.50
CONDUCTOR ATTACHMENT HEIGHT (m)	14
SIDES	12
APPROXIMATE TOTAL LENGTH (m)	18.5
TIP DIAMETER (mm)	300
BASE DIAMETER (mm)	950
WALL THICKNESS (mm)	8
BASE PLATE O.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE I.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE THICKNESS (mm)	MANUFACTURER TO CONFIRM
H.D. BOLTS (qty)	MANUFACTURER TO CONFIRM
H.D. BOLTS DIAMETER (mm)	MANUFACTURER TO CONFIRM
H.D. BOLT PCD (mm)	MANUFACTURER TO CONFIRM
WORKING TIP LOAD (kN)	67.3
BASE G.L. MOMENT (kNm)	1245
BASELINE ESKOM STANDARD FOUNDATION REF (kNm)	2000
APPROXIMATE MASS (tons)	2.66
APPROXIMATE MAST UTILISATION (%)	70

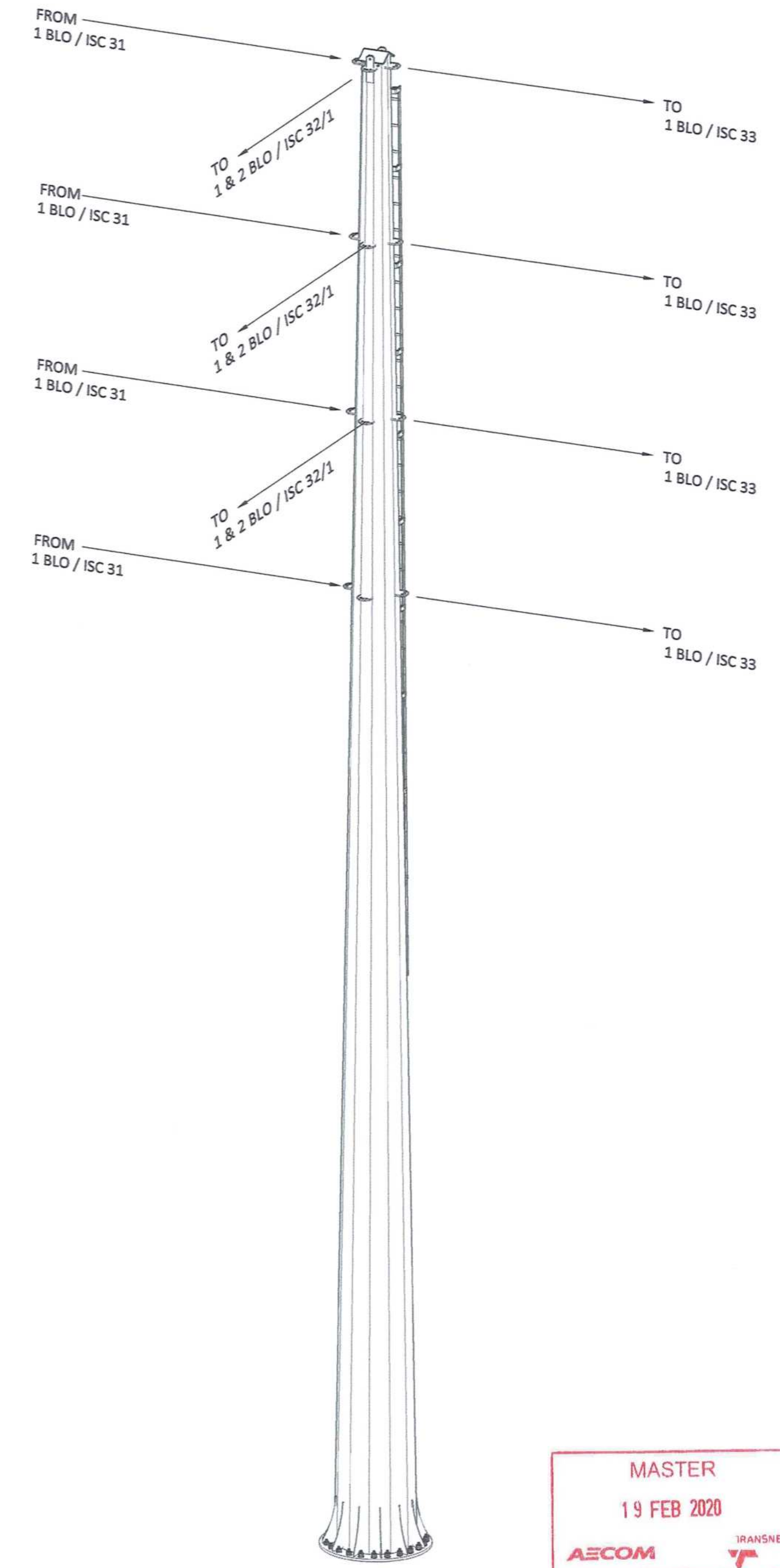
**ADDITIONAL NOTES:**

- THE DESIGN OF THESE STRUCTURES IS GENERALLY IN ACCORDANCE WITH ASCE STANDARD 48-11 DESIGN OF STEEL TRANSMISSION POLE STRUCTURES. MANUFACTURE AND INSTALLATION SHOULD ALSO MEET THE REQUIREMENT OF THE SAME PUBLICATION.
- POLES WILL HAVE THE LOWEST NUMBER OF SLIP JOINTS IN CONFORMANCE WITH THE LIMITATION IMPOSED BY THE LENGTH OF THE GALVANIZING BATH. SLIP JOINTS LENGTH IS TO BE 1.5 TIMES LARGEST I.D. OF THE FEMALE SECTION.
- FULL PENETRATION WELDS ARE TO BE USED ON:
  - ALL SECTIONS JOINED BY THE CIRCUMFERENTIAL WELDS.
  - ALL LONGITUDINAL WELDS WITHIN 75mm OF CIRCUMFERENTIAL WELDS OR IN THE FEMALE SECTION OF A SLIP JOINT.
- ACCESS LADDERS ARE REQUIRED ON ALL STRUCTURES FROM APPROXIMATELY 6m ABOVE GROUND LEVEL.
- FOR FURTHER INFORMATION, REFER TO RESPECTIVE ESKOM STANDARDS AND SPECIFICATIONS.
- MATERIAL : S355JR STEEL.
- WELDING TO BE 8mm CONTINUOUS SEAL TO SANS 10162, UNLESS REQUIRED OTHERWISE.
- HOP DIP GALVANIZING TO SANS 121.
- STRESS RELIEVING TO BE APPLIED IN ACCORDANCE WITH SANS 121 TOLERANCES:
  - ON DIMENSION 2mm
  - ON DRILLING CENTRE'S 2mm



**TRANSVERSE VIEW**

**IN-LINE VIEW**



**ISOMETRIC VIEW**



**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- THIS DRAWING DEPICTS THE DESIGN INTENT ONLY, NOT THE FINAL DESIGN
- THE MAST SHALL BE IN FULL COMPLIANCE WITH ESKOM WCOU, AND WHERE APPLICABLE, NATIONAL REQUIREMENTS.
- FOR FINAL DESIGN PURPOSES, THE CONTRACTOR SHALL ALSO CROSS REFERENCE THE DRAWING WITH THE WORKS INFORMATION, TECHNICAL SPECIFICATIONS, BOQ, ESKOM (FDP) FINAL DESIGN PACKAGE AND ANY OTHER ASSOCIATED CONTRACT DOCUMENTATION.



CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJÉ DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION.	DD	CP	CP	2020-02-17

**REVISIONS**

This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	<i>[Signature]</i>	20 02 17				
CHECKED	KS	<i>[Signature]</i>	20 02 17				
DESIGNED	NM	<i>[Signature]</i>	20 02 17				
CHECKED	CP	<i>[Signature]</i>	20 02 17				

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

PR.ENG. / PR.TECH./PR. ARCH			
NAME	CPYM	DATE	

REG. NUMBER	201270126
SCALE	N.T.S.

**Transnet Capital Projects**

TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 199000200006  
TABLE BAY BUILDING, TYGERBERG PARK,  
163 UYS KRIGER DRIVE, PLATTEKLOOF, 8001  
TEL: 021 940 1999  
FAX: 086 677 2455

**PORT OF SALDANHA**

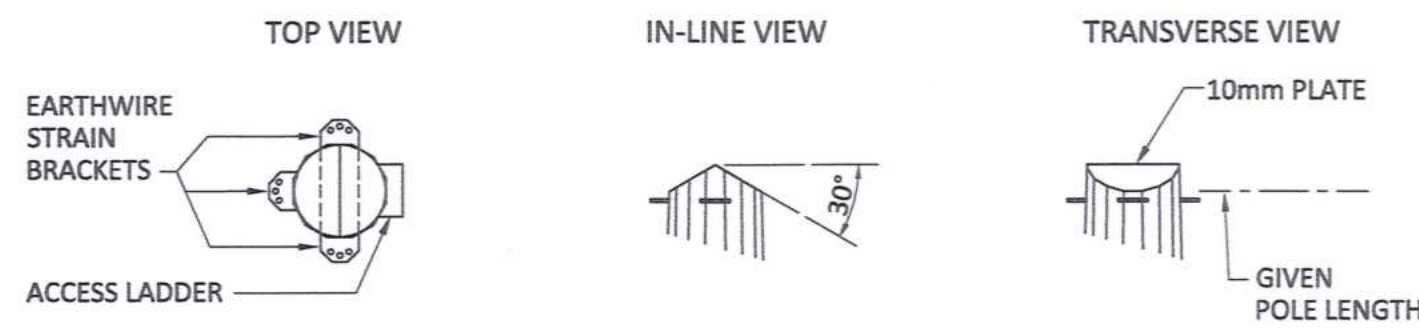
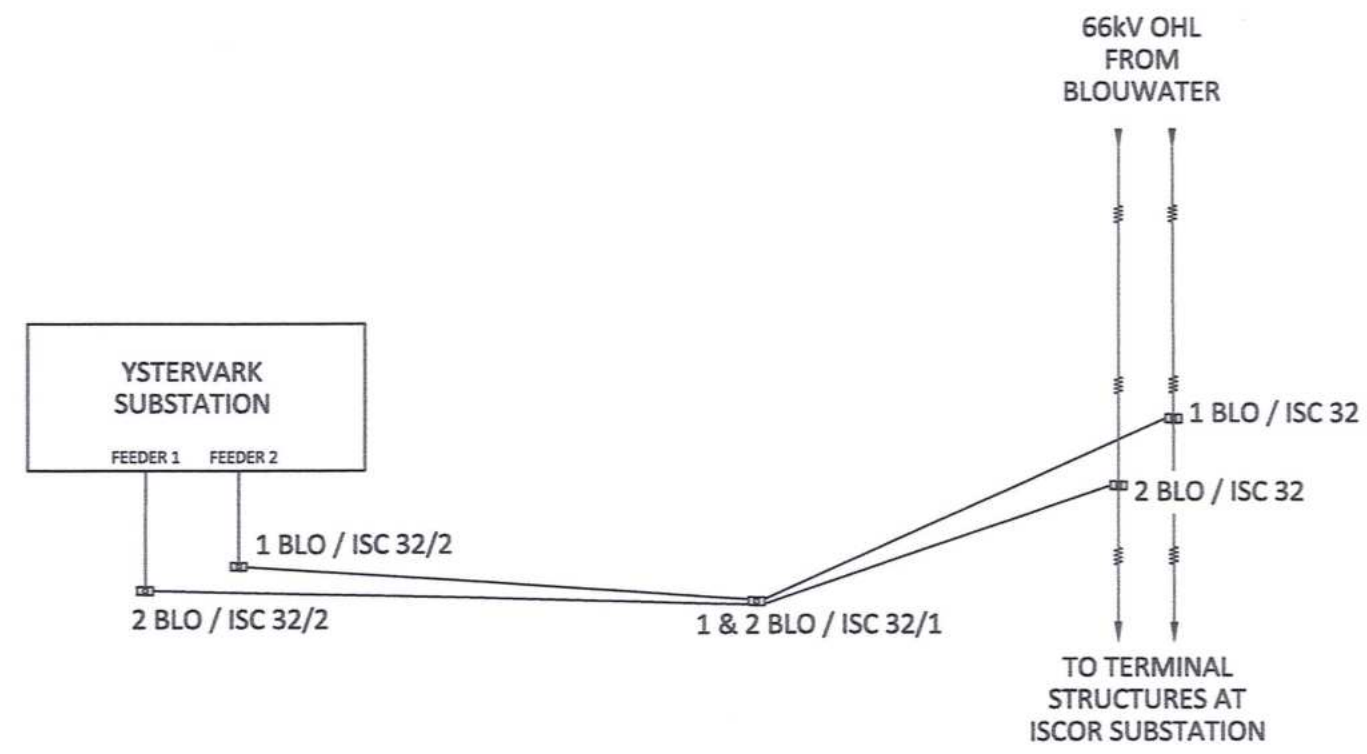
**IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE :  
66 kV BRANCH LINE MAST -  
T-OFF STRUCTURE (1 BLO / ISC 32)**

PROJECT NUMBER	00	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	300	E	DE	0062	01	00	AE

DRAWING NO.	REFERENCE

**REFERENCE DRAWINGS**

**KEYPLAN**



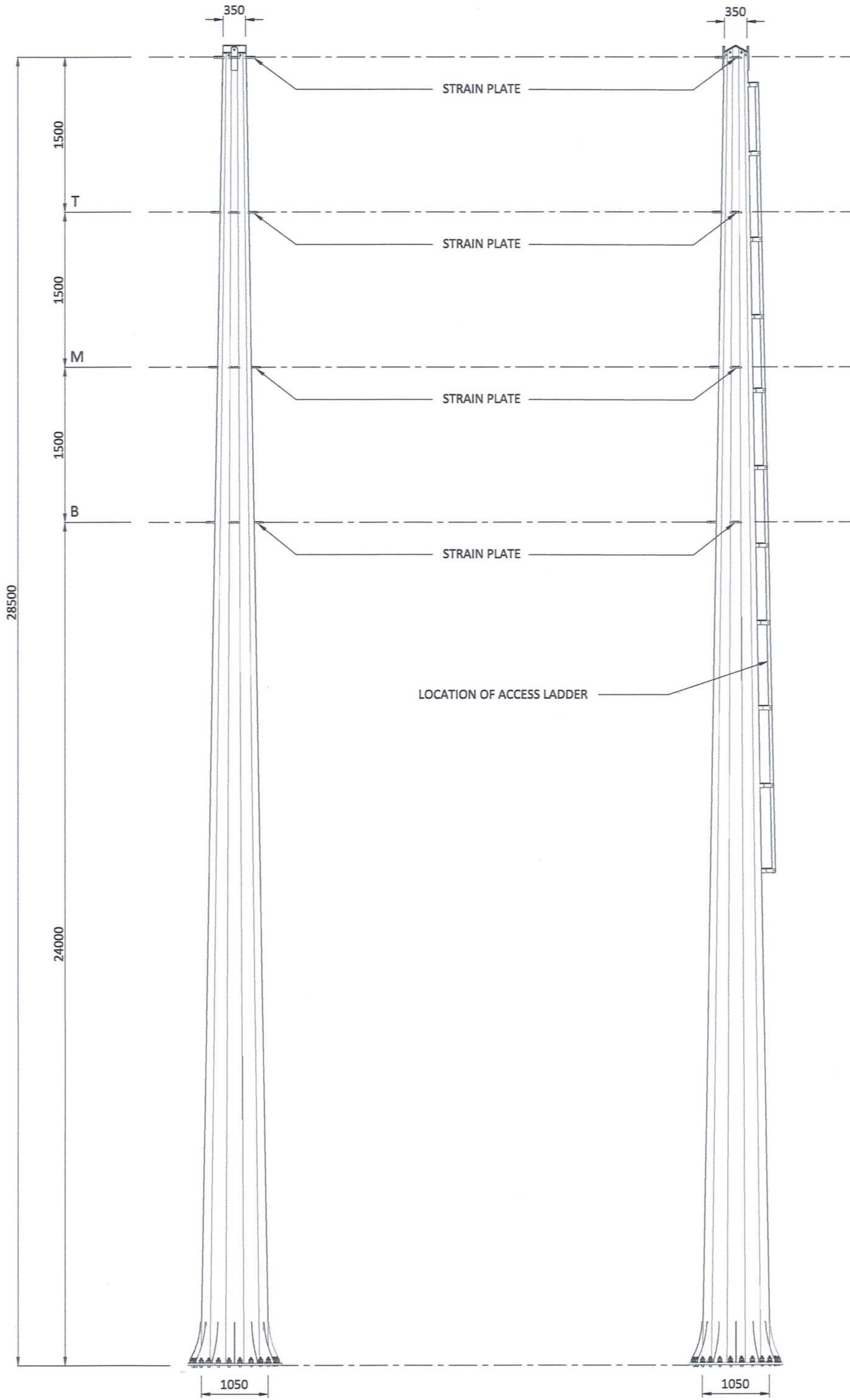
**DETAILS AT TOP OF POLE**

**SINGLE CIRCUIT T-OFF STRUCTURE, 24m CAH**

MAST NUMBER	2 BLO / ISC 32
PHASE CONDUCTOR : TYPE 1	CHICADEE ACSR
OPGW CONDUCTOR	NONE
SHIELD CONDUCTOR	OAK AAAC
VERTICAL $\phi - \phi$ SPACING (m)	1.50
VERTICAL $\epsilon - \phi$ SPACING (m)	1.50
CONDUCTOR ATTACHMENT HEIGHT (m)	24.00
SIDES	12
APPROXIMATE TOTAL LENGTH (m)	28.5
TIP DIAMETER (mm)	350
BASE DIAMETER (mm)	1050
WALL THICKNESS (mm)	10
BASE PLATE O.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE I.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE THICKNESS (mm)	MANUFACTURER TO CONFIRM
H.D. BOLTS (qty)	MANUFACTURER TO CONFIRM
H.D. BOLTS DIAMETER (mm)	MANUFACTURER TO CONFIRM
H.D. BOLT PCD (mm)	MANUFACTURER TO CONFIRM
WORKING TIP LOAD (kN)	77.8
BASE G.L. MOMENT (kNm)	2217
BASELINE ESKOM STANDARD FOUNDATION REF (kNm)	3000
APPROXIMATE MASS (tons)	5.51
APPROXIMATE MAST UTILISATION (%)	86

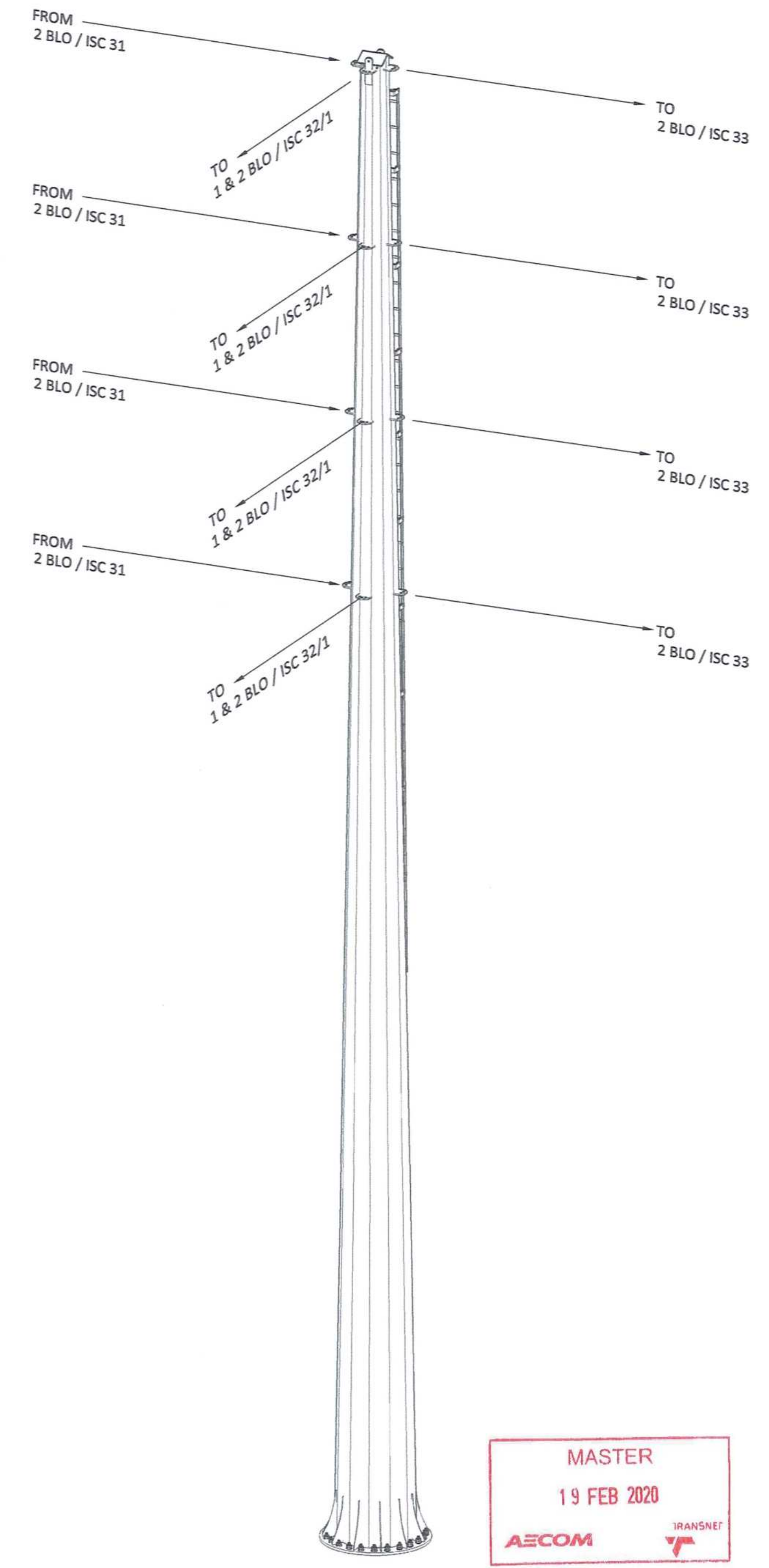
**ADDITIONAL NOTES:**

- THE DESIGN OF THESE STRUCTURES IS GENERALLY IN ACCORDANCE WITH ASCE STANDARD 48-11 DESIGN OF STEEL TRANSMISSION POLE STRUCTURES. MANUFACTURE AND INSTALLATION SHOULD ALSO MEET THE REQUIREMENT OF THE SAME PUBLICATION.
- POLES WILL HAVE THE LOWEST NUMBER OF SLIP JOINTS IN CONFORMANCE WITH THE LIMITATION IMPOSED BY THE LENGTH OF THE GALVANIZING BATH. SLIP JOINTS LENGTH IS TO BE 1.5 TIMES LARGEST I.D. OF THE FEMALE SECTION.
- FULL PENETRATION WELDS ARE TO BE USED ON:
  - ALL SECTIONS JOINED BY THE CIRCUMFERENTIAL WELDS.
  - ALL LONGITUDINAL WELDS WITHIN 75mm OF CIRCUMFERENTIAL WELDS OR IN THE FEMALE SECTION OF A SLIP JOINT.
- ACCESS LADDERS ARE REQUIRED ON ALL STRUCTURES FROM APPROXIMATELY 6m ABOVE GROUND LEVEL.
- FOR FURTHER INFORMATION, REFER TO RESPECTIVE ESKOM STANDARDS AND SPECIFICATIONS.
- MATERIAL : S355JR STEEL.
- WELDING TO BE 8mm CONTINUOUS SEAL TO SANS 10162, UNLESS REQUIRED OTHERWISE.
- HOP DIP GALVANIZING TO SANS 121.
- STRESS RELIEVING TO BE APPLIED IN ACCORDANCE WITH SANS 121 TOLERANCES:
  - ON DIMENSION 2mm
  - ON DRILLING CENTRE'S 2mm



**TRANSVERSE VIEW**

**IN-LINE VIEW**



**ISOMETRIC VIEW**



**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- THIS DRAWING DEPICTS THE DESIGN INTENT ONLY, NOT THE FINAL DESIGN
- THE MAST SHALL BE IN FULL COMPLIANCE WITH ESKOM WCOU, AND WHERE APPLICABLE, NATIONAL REQUIREMENTS.
- FOR FINAL DESIGN PURPOSES, THE CONTRACTOR SHALL ALSO CROSS REFERENCE THE DRAWING WITH THE WORKS INFORMATION, TECHNICAL SPECIFICATIONS, BOQ, ESKOM (FDP) FINAL DESIGN PACKAGE AND ANY OTHER ASSOCIATED CONTRACT DOCUMENTATION.



CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJÉ DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION.	DD	CP	CP	2020-02-17

**REVISIONS**

This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	[Signature]	20 02 17				
CHECKED	KS	[Signature]	20 02 17				
DESIGNED	NM	[Signature]	20 02 17				
CHECKED	CP	[Signature]	20 02 17				

**TRANSNET CAPITAL PROJECTS**  
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1995/000000/06  
TABLE BAY BUILDING, TYGERBERG PARK,  
163 UYS KRIGE DRIVE, PLATTEKLOOF, 8001  
TEL: 021 940 1999  
FAX: 086 677 2455

**PORT OF SALDANHA**

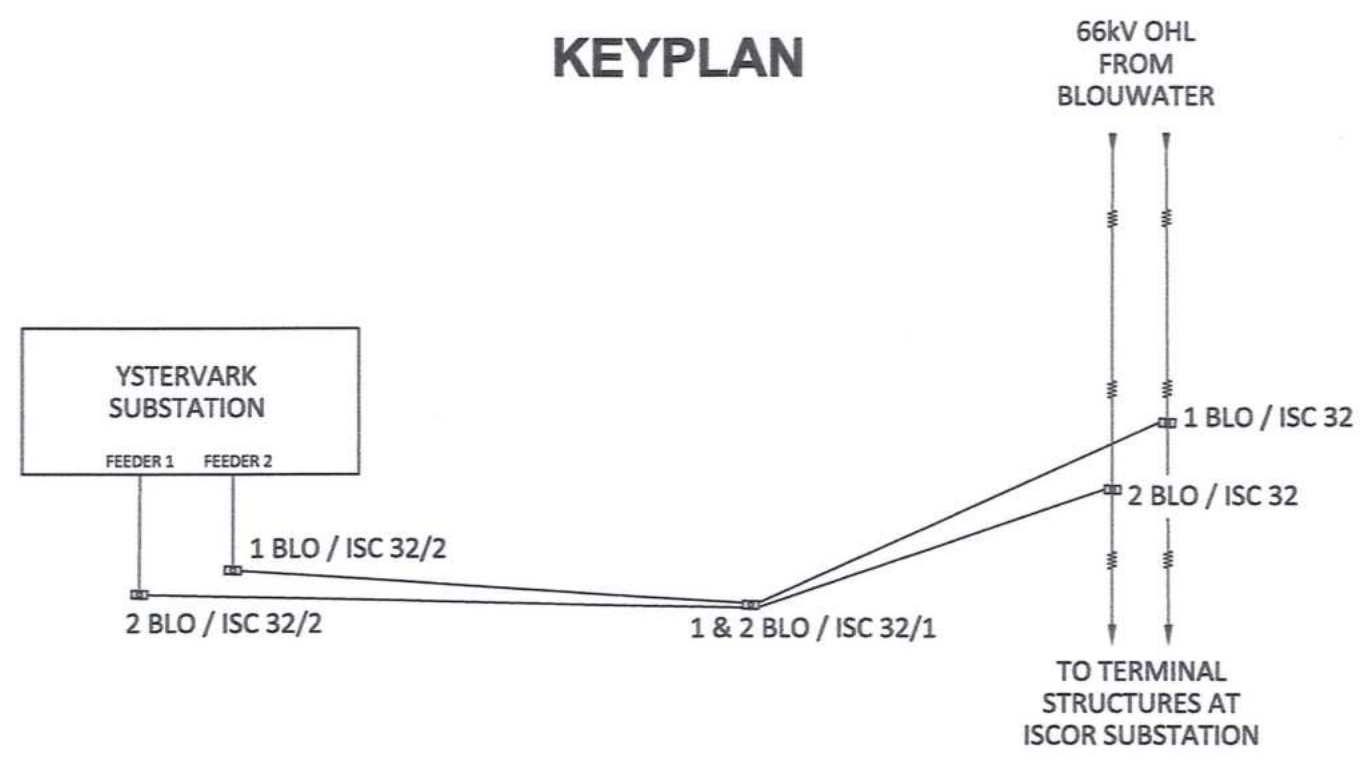
**IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE :  
66 KV BRANCH LINE MAST -  
T-OFF STRUCTURE (2 BLO / ISC 32)**

PROJECT NUMBER	001	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
	1924701	2	300	E	01063	01	00	AE

DRAWING NO.	REFERENCE

**REFERENCE DRAWINGS**

**KEYPLAN**



A

B

C

D

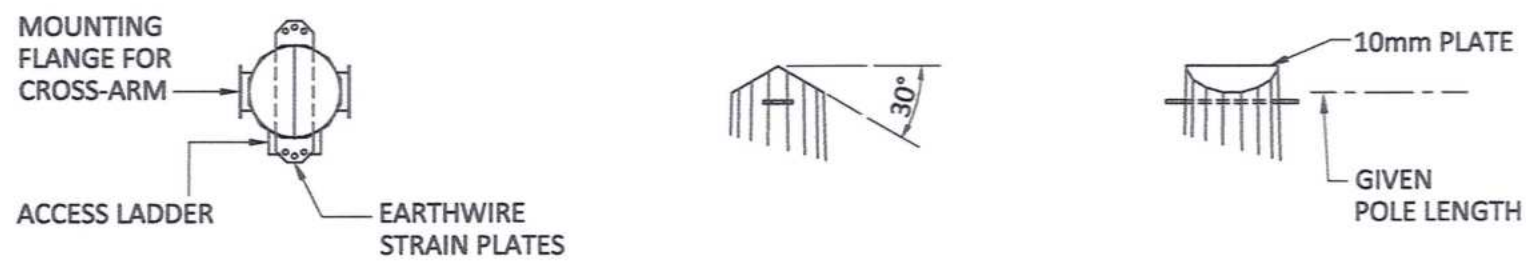
E

F

**TOP VIEW**

**IN-LINE VIEW**

**TRANSVERSE VIEW**



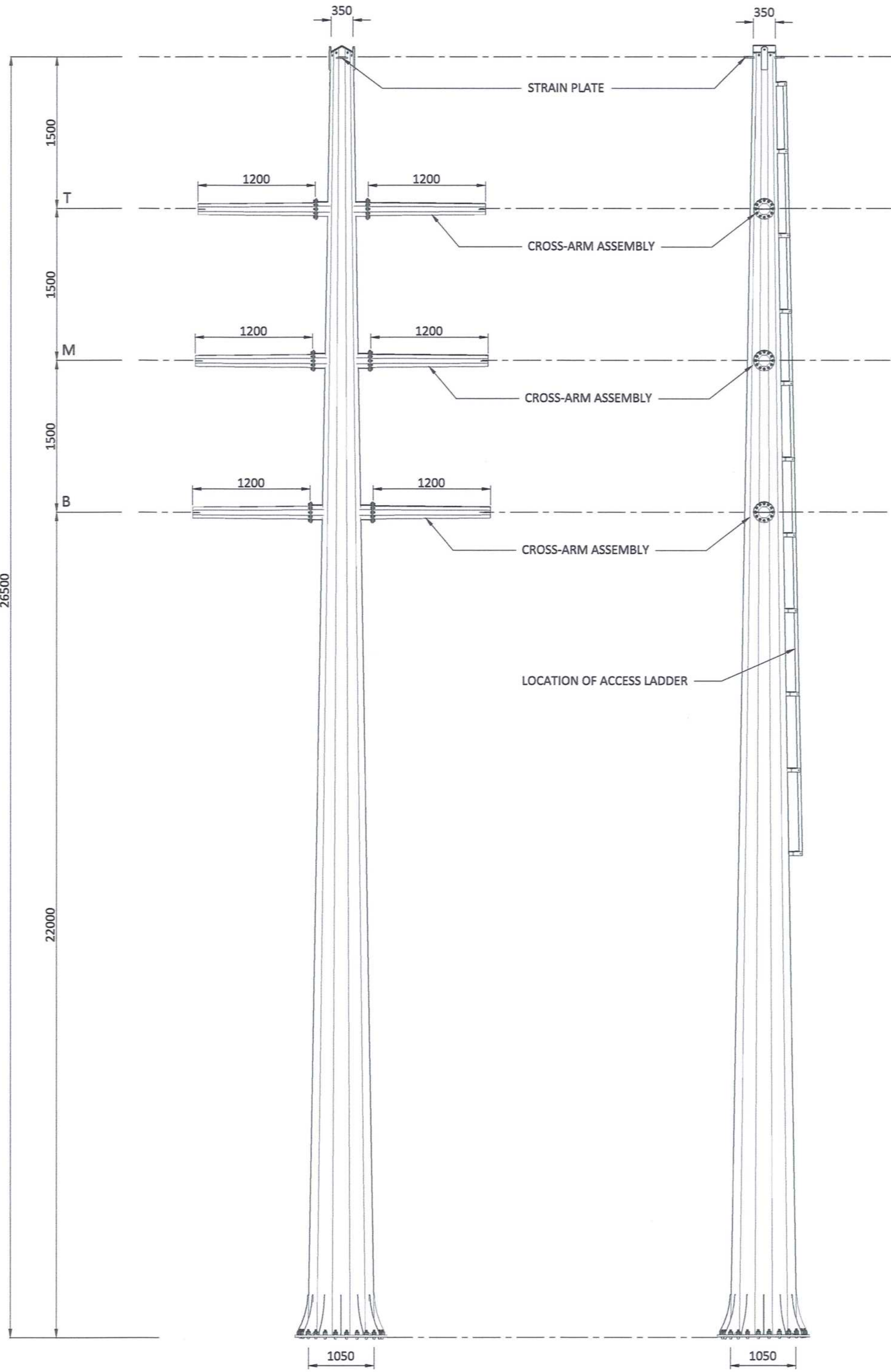
**DETAILS AT TOP OF POLE**

**DOUBLE CIRCUIT STRAIN STRUCTURE, 22m CAH**

MAST NUMBER	1 & 2 BLO / ISC 32/1
PHASE CONDUCTOR : TYPE 1	CHICADEE ACSR
OPGW CONDUCTOR	NONE
SHIELD CONDUCTOR	OAK AAAC
VERTICAL $\phi - \phi$ SPACING (m)	1.50
VERTICAL $\epsilon - \phi$ SPACING (m)	1.50
CONDUCTOR ATTACHMENT HEIGHT (m)	22
SIDES	12
APPROXIMATE TOTAL LENGTH (m)	26.5
TIP DIAMETER (mm)	350
BASE DIAMETER (mm)	1050
WALL THICKNESS (mm)	10
BASE PLATE O.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE I.D (mm)	MANUFACTURER TO CONFIRM
BASE PLATE THICKNESS (mm)	MANUFACTURER TO CONFIRM
H.D. BOLTS (qty)	MANUFACTURER TO CONFIRM
H.D BOLTS DIAMETER (mm)	MANUFACTURER TO CONFIRM
H.D. BOLT PCD (mm)	MANUFACTURER TO CONFIRM
WORKING TIP LOAD (kN)	84.1
BASE G.L.MOMENT (kNm)	2229.3
BASELINE ESKOM STANDARD FOUNDATION REF (kNm)	3000
APPROXIMATE MASS (tons)	5.51
APPROXIMATE MAST UTILISATION (%)	84

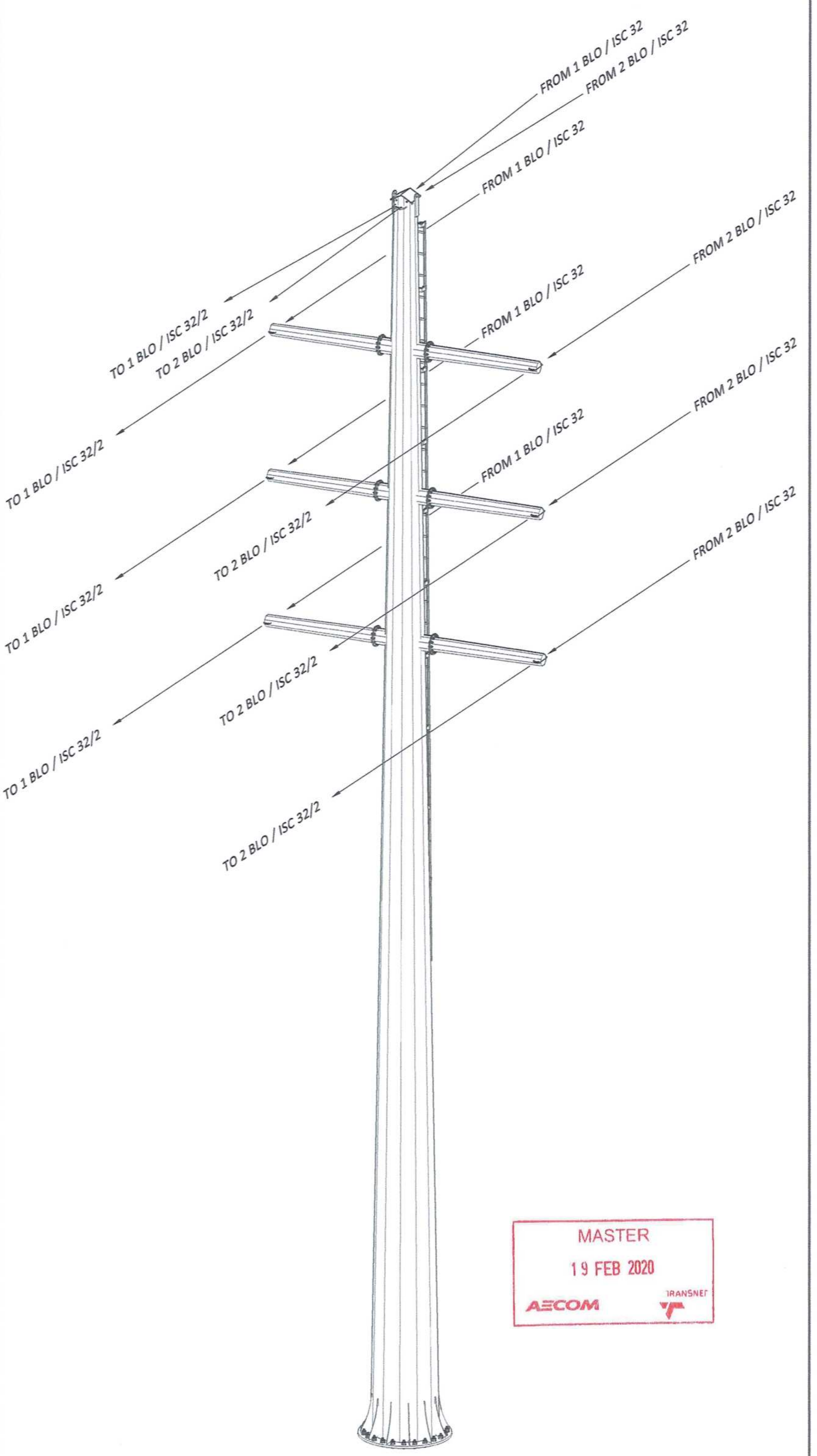
**ADDITIONAL NOTES:**

- THE DESIGN OF THESE STRUCTURES IS GENERALLY IN ACCORDANCE WITH ASCE STANDARD 48-11 DESIGN OF STEEL TRANSMISSION POLE STRUCTURES. MANUFACTURE AND INSTALLATION SHOULD ALSO MEET THE REQUIREMENT OF THE SAME PUBLICATION.
- POLES WILL HAVE THE LOWEST NUMBER OF SLIP JOINTS IN CONFORMANCE WITH THE LIMITATION IMPOSED BY THE LENGTH OF THE GALVANIZING BATH. SLIP JOINTS LENGTH IS TO BE 1.5 TIMES LARGEST I.D. OF THE FEMALE SECTION.
- FULL PENETRATION WELDS ARE TO BE USED ON:
  - ALL SECTIONS JOINED BY THE CIRCUMFERENTIAL WELDS.
  - ALL LONGITUDINAL WELDS WITHIN 75mm OF CIRCUMFERENTIAL WELDS OR IN THE FEMALE SECTION OF A SLIP JOINT.
- ACCESS LADDERS ARE REQUIRED ON ALL STRUCTURES FROM APPROXIMATELY 6m ABOVE GROUND LEVEL.
- FOR FURTHER INFORMATION, REFER TO RESPECTIVE ESKOM STANDARDS AND SPECIFICATIONS.
- MATERIAL : S355JR STEEL.
- WELDING TO BE 8mm CONTINUOUS SEAL TO SANS 10162, UNLESS REQUIRED OTHERWISE.
- HOP DIP GALVANIZING TO SANS 121.
- STRESS RELIEVING TO BE APPLIED IN ACCORDANCE WITH SANS 121 TOLERANCES:
  - ON DIMENSION 2mm
  - ON DRILLING CENTRE'S 2mm



**IN-LINE VIEW**

**TRANSVERSE VIEW**



**ISOMETRIC VIEW**

MASTER  
19 FEB 2020  
AECOM TRANSNET

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- THIS DRAWING DEPICTS THE DESIGN INTENT ONLY, NOT THE FINAL DESIGN
- THE MAST SHALL BE IN FULL COMPLIANCE WITH ESKOM WCOU, AND WHERE APPLICABLE, NATIONAL REQUIREMENTS.
- FOR FINAL DESIGN PURPOSES, THE CONTRACTOR SHALL ALSO CROSS REFERENCE THE DRAWING WITH THE WORKS INFORMATION, TECHNICAL SPECIFICATIONS, BOQ, ESKOM (FDP) FINAL DESIGN PACKAGE AND ANY OTHER ASSOCIATED CONTRACT DOCUMENTATION.



CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJÉ DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	<i>[Signature]</i>	20 02 17				
CHECKED	KS	<i>[Signature]</i>	20 02 17				
DESIGNED	NM	<i>[Signature]</i>	20 02 17				
CHECKED	CP	<i>[Signature]</i>	20 02 17				
OPERATING DIVISIONS				PR.ENG. / PR.TECH./PR. ARCH			
TITLE	NAME	SIGN	DATE	NAME	C PVM	DATE	
						20 02 17	
00 ISSUED FOR CONSTRUCTION	DD	CP	CP	2020-02-17			
NO.	DESCRIPTION	BY	CHKD	APPD	DATE		
REVISIONS							
This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.							

**Transnet Capital Projects**  
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1996/00000006  
TABLE BAY BUILDING, TYGERBERG PARK,  
163 UYS KRIGER DRIVE, PLATTEKLOOF, 8001  
TEL: 021 940 1999  
FAX: 086 677 2455

**TRANSNET**

**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE :  
66 kV BRANCH LINE MAST -  
STRAIN STRUCTURE (1 & 2 BLO / ISC 32/1)**

PROJECT NUMBER	DD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
A1	1	9	2	4	7	0	1	2
		3	0	0	E	D	E	0
					0	0	6	4
					0	1	0	0
					0	0	0	AE

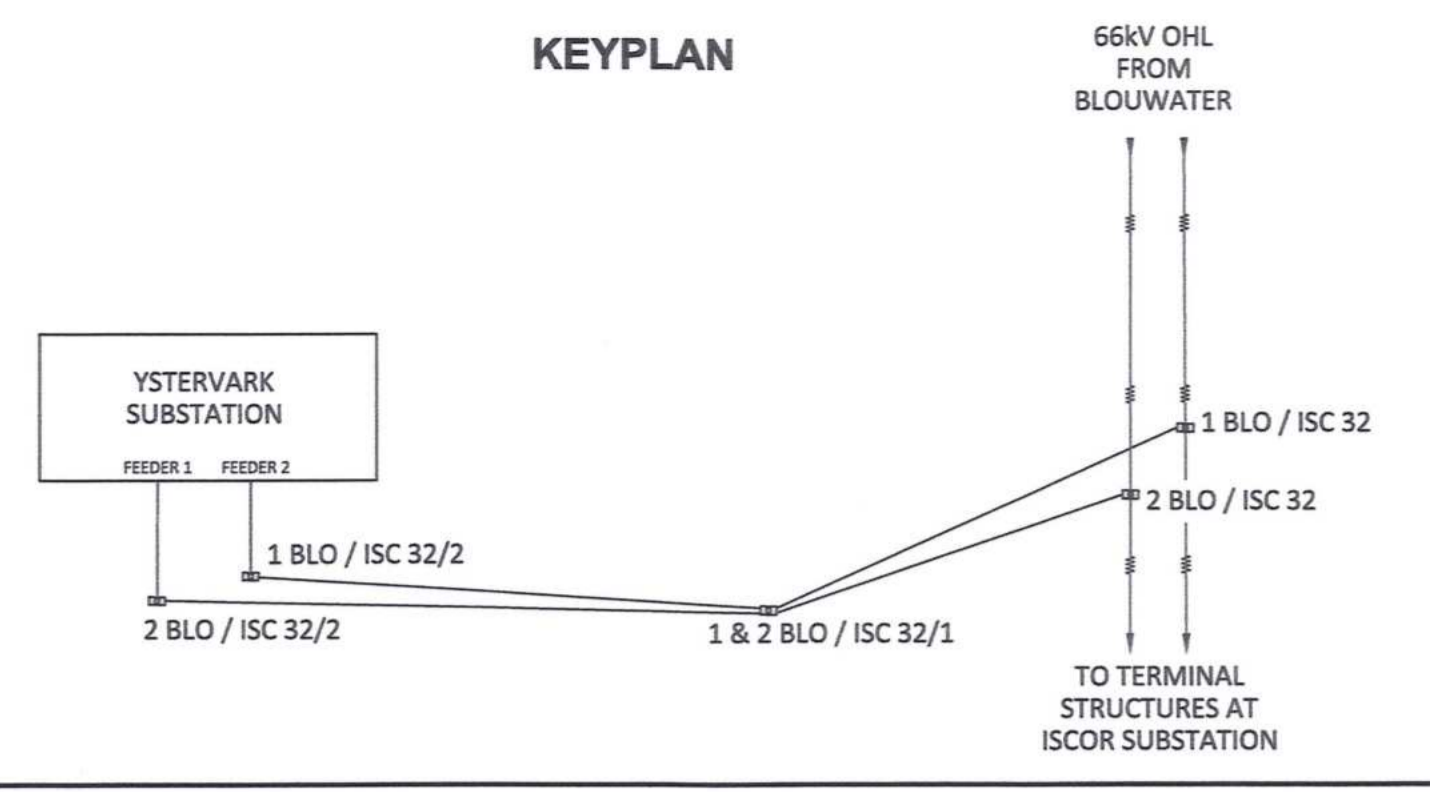
**REFERENCE DRAWINGS**

DRAWING NO.	REFERENCE
1	
2	
3	
4	
5	
6	
7	
8	

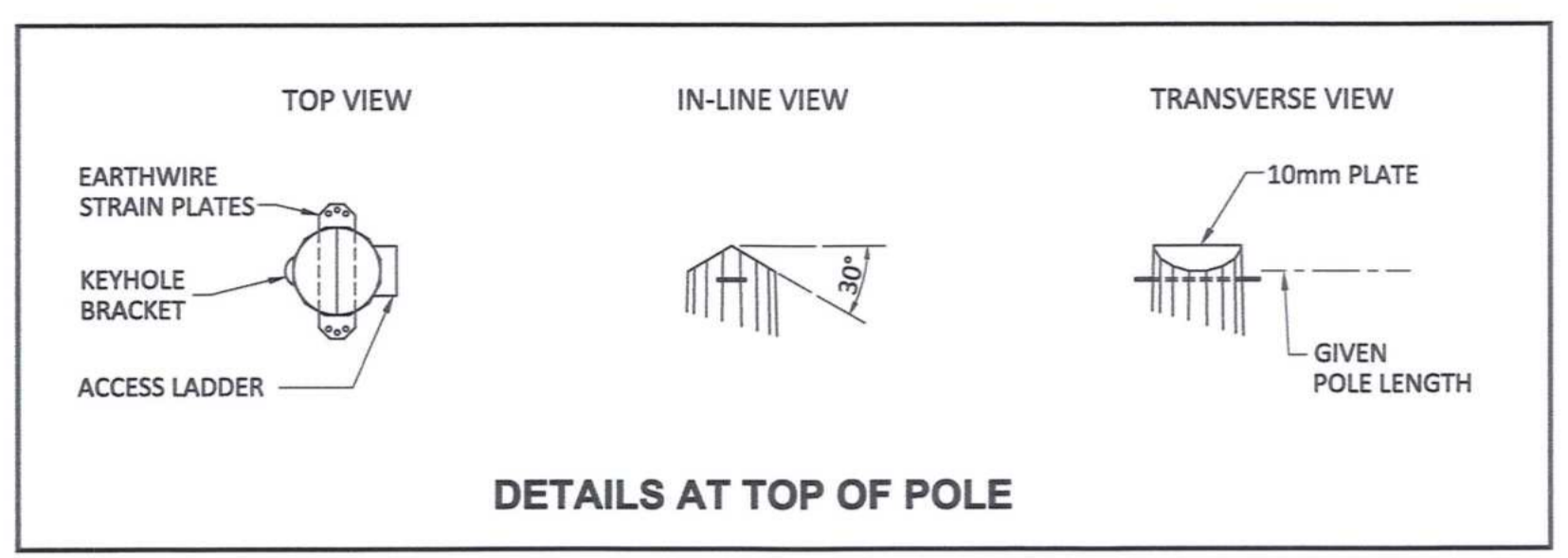
1 2 3 4 5 6 7 8

A

KEYPLAN



B



C

SINGLE CIRCUIT TERMINAL STRUCTURE, 11m CAH

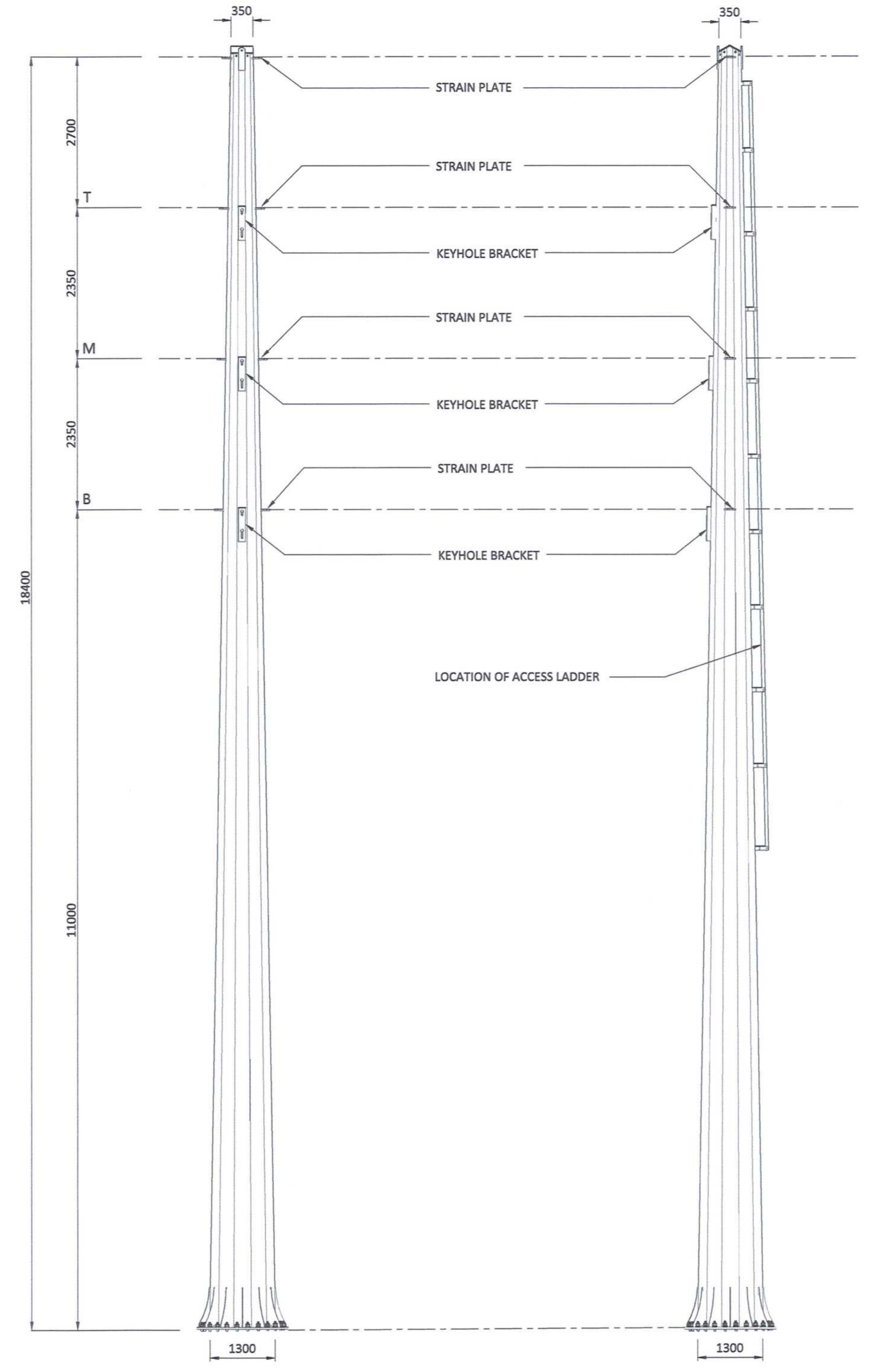
MAST NUMBER	1 BLO / ISC 32/2
PHASE CONDUCTOR : TYPE 1	CHICADEE ACSR
PHASE CONDUCTOR : TYPE 2	KINGBIRD ACSR (CLOSING SPAN)
OPGW CONDUCTOR	NONE
SHIELD CONDUCTOR	OAK AAAC
VERTICAL $\phi - \phi$ SPACING (m)	2.35
VERTICAL $\epsilon - \phi$ SPACING (m)	2.7
CONDUCTOR ATTACHMENT HEIGHT (m)	11
SIDES	16
APPROXIMATE TOTAL LENGTH (m)	18.4
TIP DIAMETER (mm)	350
BASE DIAMETER (mm)	1300
WALL THICKNESS (mm)	12
BASE PLATE O.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE I.D (mm)	MANUFACTURER TO CONFIRM
BASE PLATE THICKNESS (mm)	MANUFACTURER TO CONFIRM
H.D. BOLTS (qty)	MANUFACTURER TO CONFIRM
H.D BOLTS DIAMETER (mm)	MANUFACTURER TO CONFIRM
H.D. BOLT PCD (mm)	MANUFACTURER TO CONFIRM
WORKING TIP LOAD (kN)	210.16
BASE G.L.MOMENT (kNm)	3867
BASELINE ESKOM STANDARD FOUNDATION REF (kNm)	4500
APPROXIMATE MASS (tons)	4.70
APPROXIMATE MAST UTILISATION (%)	21.7 (INITIAL)

D

ADDITIONAL NOTES:

1. THE DESIGN OF THESE STRUCTURES IS GENERALLY IN ACCORDANCE WITH ASCE STANDARD 48-11 DESIGN OF STEEL TRANSMISSION POLE STRUCTURES. MANUFACTURE AND INSTALLATION SHOULD ALSO MEET THE REQUIREMENT OF THE SAME PUBLICATION.
2. POLES WILL HAVE THE LOWEST NUMBER OF SLIP JOINTS IN CONFORMANCE WITH THE LIMITATION IMPOSED BY THE LENGTH OF THE GALVANIZING BATH. SLIP JOINTS LENGTH IS TO BE 1.5 TIMES LARGEST I.D. OF THE FEMALE SECTION.
3. FULL PENETRATION WELDS ARE TO BE USED ON:
  - ALL SECTIONS JOINED BY THE CIRCUMFERENTIAL WELDS.
  - ALL LONGITUDINAL WELDS WITHIN 75mm OF CIRCUMFERENTIAL WELDS OR IN THE FEMALE SECTION OF A SLIP JOINT.
4. ACCESS LADDERS ARE REQUIRED ON ALL STRUCTURES FROM APPROXIMATELY 6m ABOVE GROUND LEVEL.
5. FOR FURTHER INFORMATION, REFER TO RESPECTIVE ESKOM STANDARDS AND SPECIFICATIONS.
6. MATERIAL : S355JR STEEL.
7. WELDING TO BE 8mm CONTINUOUS SEAL TO SANS 10162, UNLESS REQUIRED OTHERWISE.
8. HOP DIP GALVANIZING TO SANS 121.
9. STRESS RELIEVING TO BE APPLIED IN ACCORDANCE WITH SANS 121 TOLERANCES:
  - ON DIMENSION 2mm
  - ON DRILLING CENTRE'S 2mm

E



TRANSVERSE VIEW

IN-LINE VIEW

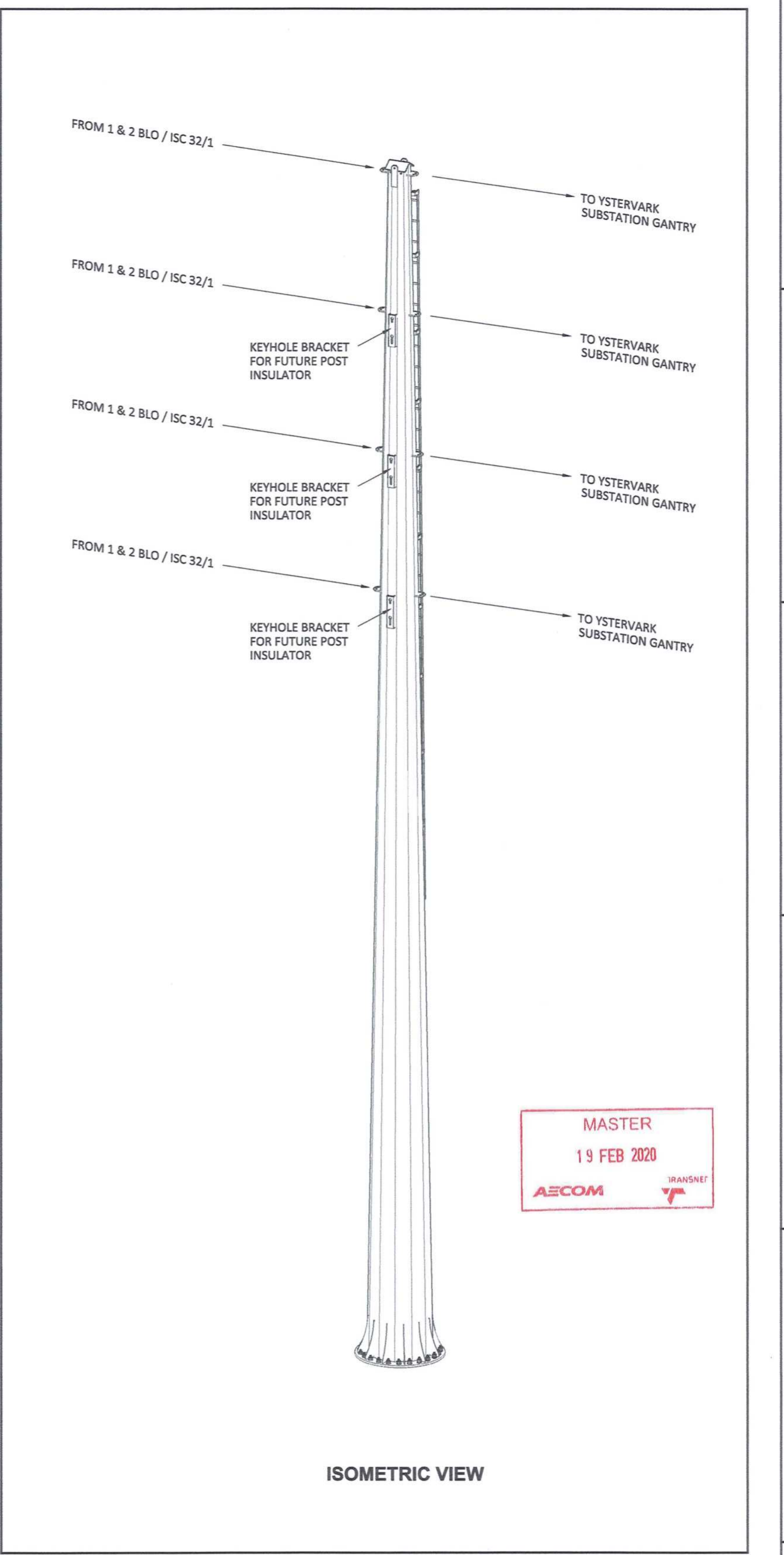
A

B

C

D

E



ISOMETRIC VIEW

MASTER  
19 FEB 2020  
AECOM TRANSNET

DRAWING NO.	REFERENCE

- NOTES
1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  3. THIS DRAWING DEPICTS THE DESIGN INTENT ONLY, NOT THE FINAL DESIGN
  4. THE MAST SHALL BE IN FULL COMPLIANCE WITH ESKOM WCOU, AND WHERE APPLICABLE, NATIONAL REQUIREMENTS.
  5. FOR FINAL DESIGN PURPOSES, THE CONTRACTOR SHALL ALSO CROSS REFERENCE THE DRAWING WITH THE WORKS INFORMATION, TECHNICAL SPECIFICATIONS, BOQ, ESKOM (FDP) FINAL DESIGN PACKAGE AND ANY OTHER ASSOCIATED CONTRACT DOCUMENTATION.



CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJÉ DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION.	DD	CP	CP	2020-02-17

REVISIONS

This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	[Signature]	20 02 17				
CHECKED	KS	[Signature]	20 02 17				
DESIGNED	NM	[Signature]	20 02 17				
CHECKED	CP	[Signature]	20 02 17				
OPERATING DIVISIONS				PRE.ENG. / PR.TECH./PR. ARCH			
				NAME C PVM DATE			
				SIGNATURE [Signature] 20 02 17			
				REG. NUMBER 201270126			
				SCALE: N.T.S.			

Transnet Capital Projects  
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1996/0000006  
TABLE BAY BUILDING, TYGERBERG PARK,  
163 LYS KRIGER DRIVE, PLATTEKLOOF,  
8001  
TEL: 021 940 1999  
FAX: 086 677 2455

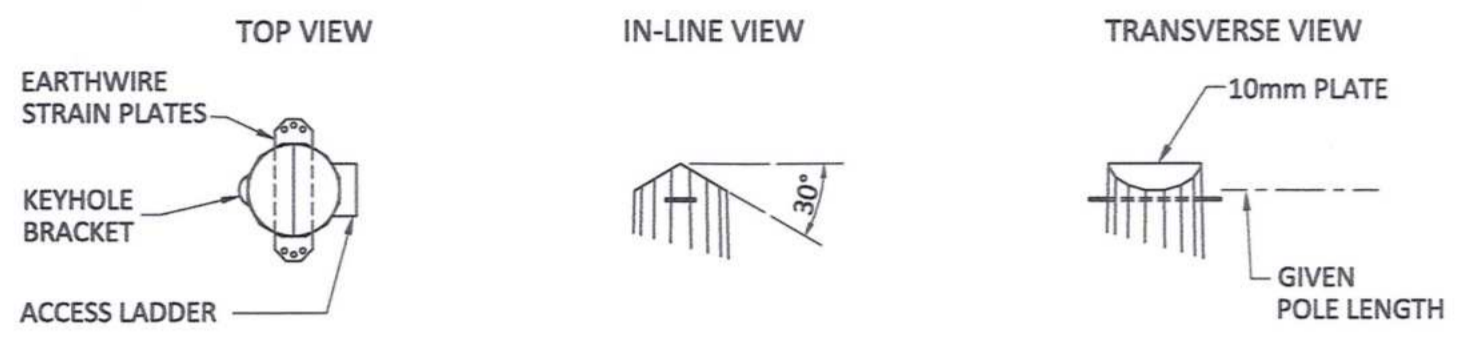
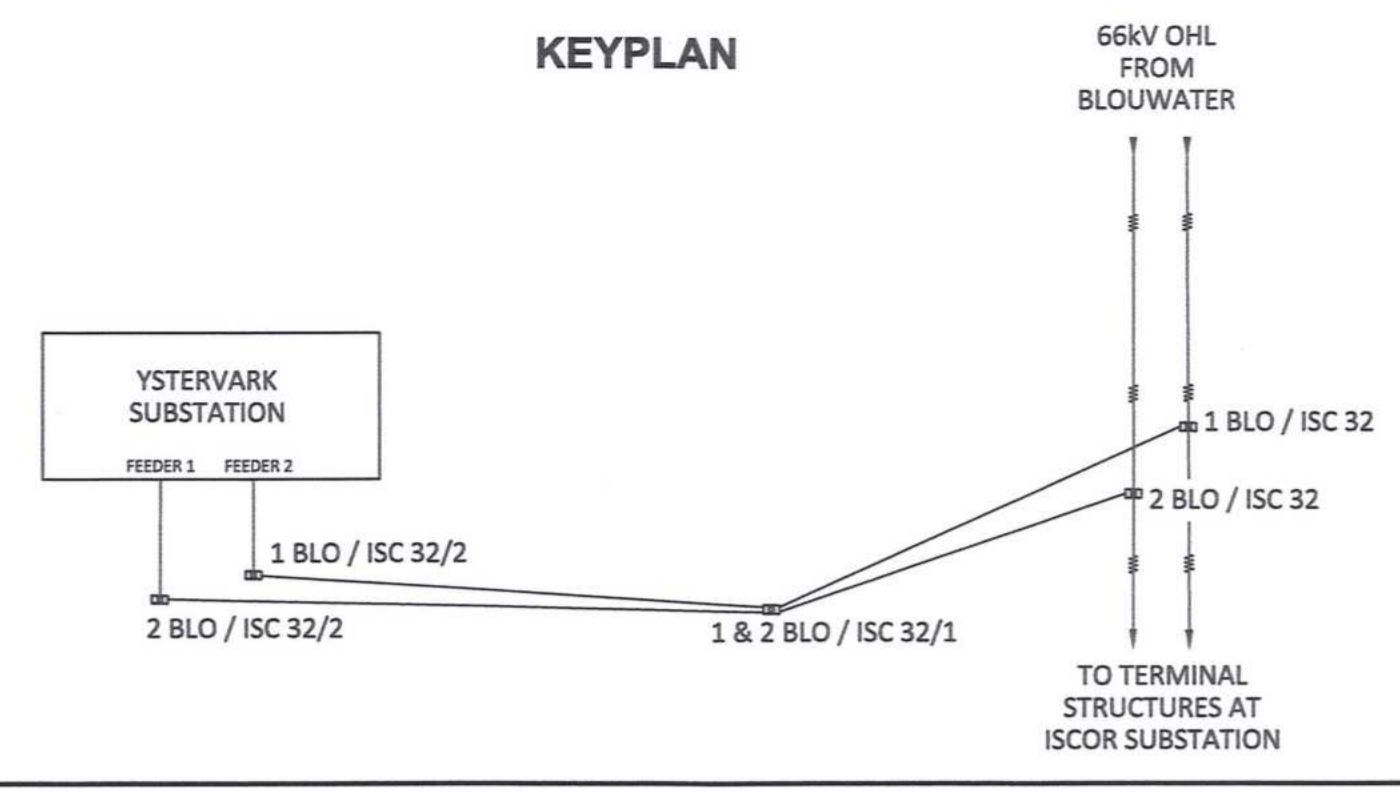
**PORT OF SALDANHA**

IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE :  
66 kV BRANCH LINE MAST -  
TERMINAL STRUCTURE (1 BLO / ISC 32/2)

PROJECT NUMBER	DD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
A1	1	9	2	4	7	0	1	-

1 2 3 4 5 6 7 8

**KEYPLAN**



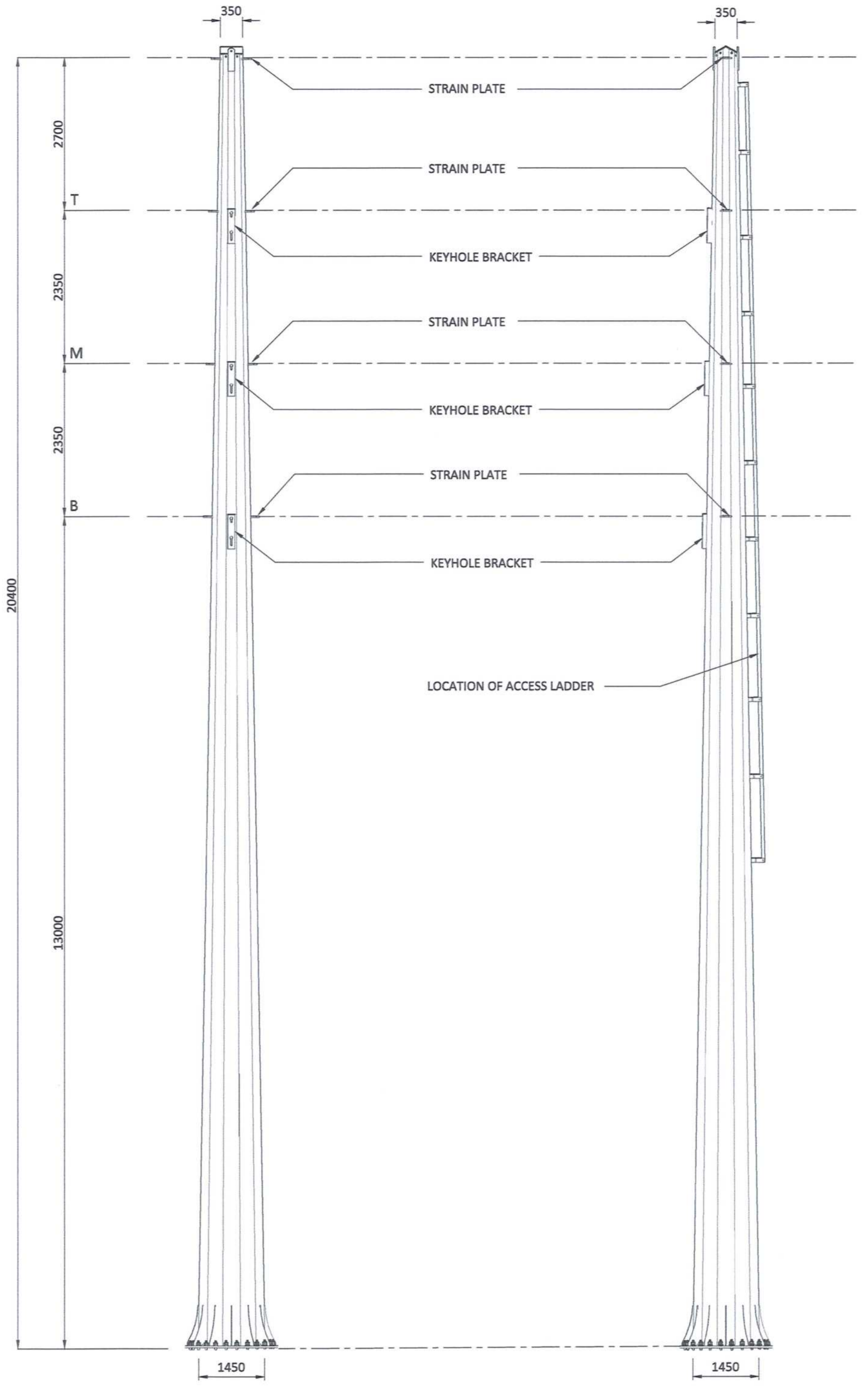
**DETAILS AT TOP OF POLE**

**SINGLE CIRCUIT TERMINAL STRUCTURE, 13m CAH**

MAST NUMBER	2 BLO / ISC 32/2
PHASE CONDUCTOR : TYPE 1	CHICADEE ACSR
PHASE CONDUCTOR : TYPE 2	KINGBIRD ACSR (CLOSING SPAN)
OPGW CONDUCTOR	NONE
SHIELD CONDUCTOR	OAK AAAC
VERTICAL $\phi - \phi$ SPACING (m)	2.35
VERTICAL $\epsilon - \phi$ SPACING (m)	2.7
CONDUCTOR ATTACHMENT HEIGHT (m)	13
SIDES	16
APPROXIMATE TOTAL LENGTH (m)	20.4
TIP DIAMETER (mm)	350
BASE DIAMETER (mm)	1450
WALL THICKNESS (mm)	12
BASE PLATE O.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE I.D. (mm)	MANUFACTURER TO CONFIRM
BASE PLATE THICKNESS (mm)	MANUFACTURER TO CONFIRM
H.D. BOLTS (qty)	MANUFACTURER TO CONFIRM
H.D. BOLTS DIAMETER (mm)	MANUFACTURER TO CONFIRM
H.D. BOLT PCD (mm)	MANUFACTURER TO CONFIRM
WORKING TIP LOAD (kN)	217.70
BASE G.L. MOMENT (kNm)	4441
BASELINE ESKOM STANDARD FOUNDATION REF (kNm)	5000
APPROXIMATE MASS (tons)	5.66
APPROXIMATE MAST UTILISATION (%)	30.0 (INITIAL)

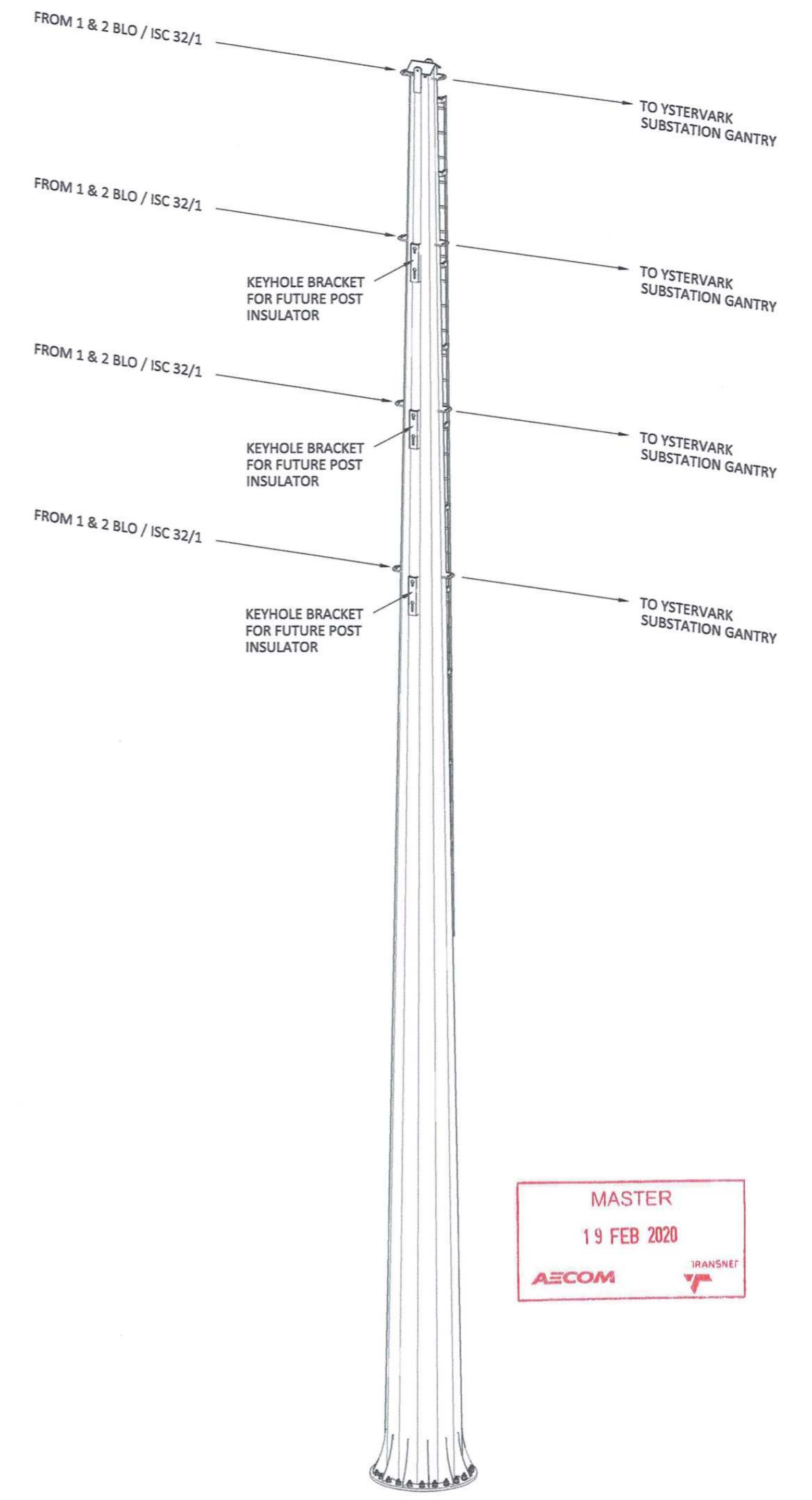
**ADDITIONAL NOTES:**

- THE DESIGN OF THESE STRUCTURES IS GENERALLY IN ACCORDANCE WITH ASCE STANDARD 48-11 DESIGN OF STEEL TRANSMISSION POLE STRUCTURES. MANUFACTURE AND INSTALLATION SHOULD ALSO MEET THE REQUIREMENT OF THE SAME PUBLICATION.
- POLES WILL HAVE THE LOWEST NUMBER OF SLIP JOINTS IN CONFORMANCE WITH THE LIMITATION IMPOSED BY THE LENGTH OF THE GALVANIZING BATH. SLIP JOINTS LENGTH IS TO BE 1.5 TIMES LARGEST I.D. OF THE FEMALE SECTION.
- FULL PENETRATION WELDS ARE TO BE USED ON:
  - ALL SECTIONS JOINED BY THE CIRCUMFERENTIAL WELDS.
  - ALL LONGITUDINAL WELDS WITHIN 75mm OF CIRCUMFERENTIAL WELDS OR IN THE FEMALE SECTION OF A SLIP JOINT.
- ACCESS LADDERS ARE REQUIRED ON ALL STRUCTURES FROM APPROXIMATELY 6m ABOVE GROUND LEVEL.
- FOR FURTHER INFORMATION, REFER TO RESPECTIVE ESKOM STANDARDS AND SPECIFICATIONS.
- MATERIAL : S355JR STEEL.
- WELDING TO BE 8mm CONTINUOUS SEAL TO SANS 10162, UNLESS REQUIRED OTHERWISE.
- HOP DIP GALVANIZING TO SANS 121.
- STRESS RELIEVING TO BE APPLIED IN ACCORDANCE WITH SANS 121 TOLERANCES:
  - ON DIMENSION 2mm
  - ON DRILLING CENTRE'S 2mm



**TRANSVERSE VIEW**

**IN-LINE VIEW**



**ISOMETRIC VIEW**

**MASTER**  
 19 FEB 2020  
 AECOM TRANSNET

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- THIS DRAWING DEPICTS THE DESIGN INTENT ONLY, NOT THE FINAL DESIGN
- THE MAST SHALL BE IN FULL COMPLIANCE WITH ESKOM WCOU, AND WHERE APPLICABLE, NATIONAL REQUIREMENTS.
- FOR FINAL DESIGN PURPOSES, THE CONTRACTOR SHALL ALSO CROSS REFERENCE THE DRAWING WITH THE WORKS INFORMATION, TECHNICAL SPECIFICATIONS, BOQ, ESKOM (FDP) FINAL DESIGN PACKAGE AND ANY OTHER ASSOCIATED CONTRACT DOCUMENTATION.



CAPE TOWN OFFICE  
 WATERSIDE PLACE, SOUTH GATE  
 TYGER WATERFRONT  
 CARL CRONJÉ DRIVE  
 TEL: +27 (0)21 950 7500  
 FAX: +27 (0)21 950 7502  
 REG. No. 1966/006628/07

REVISIONS					
NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION.	DD	CP	CP	2020-02-17

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	[Signature]	20 02 17				
CHECKED	KS	[Signature]	20 02 17				
DESIGNED	NM	[Signature]	20 02 17				
CHECKED	CP	[Signature]	20 02 17				

**TRANSNET**  
 Transnet Capital Projects  
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1996/006628/07  
 TABLE BAY BUILDING, TYGERBERG PARK,  
 163 UYS KRIGER DRIVE, PLATTEKLOOF, 8001  
 TEL: 021 940 1999  
 FAX: 086 677 2455

**PORT OF SALDANHA**

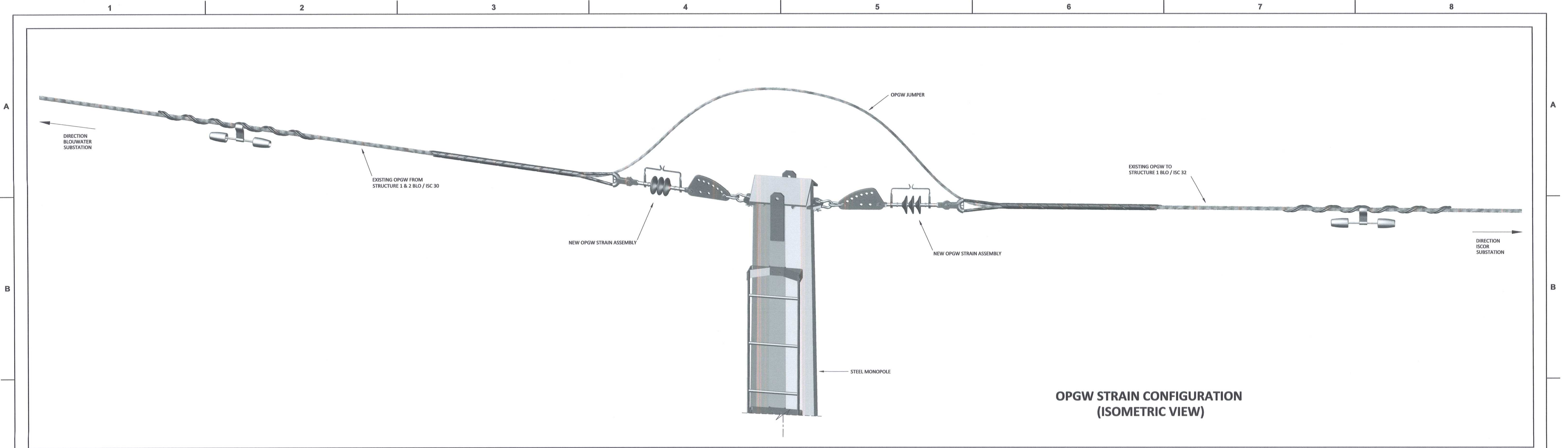
**IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE :  
 66 kV BULK LINE MAST -  
 TERMINAL STRUCTURE (2 BLO / ISC 32/2)**

PROJECT NUMBER	00	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
	1924701	2	300	E	DE-0066	01	00	AE

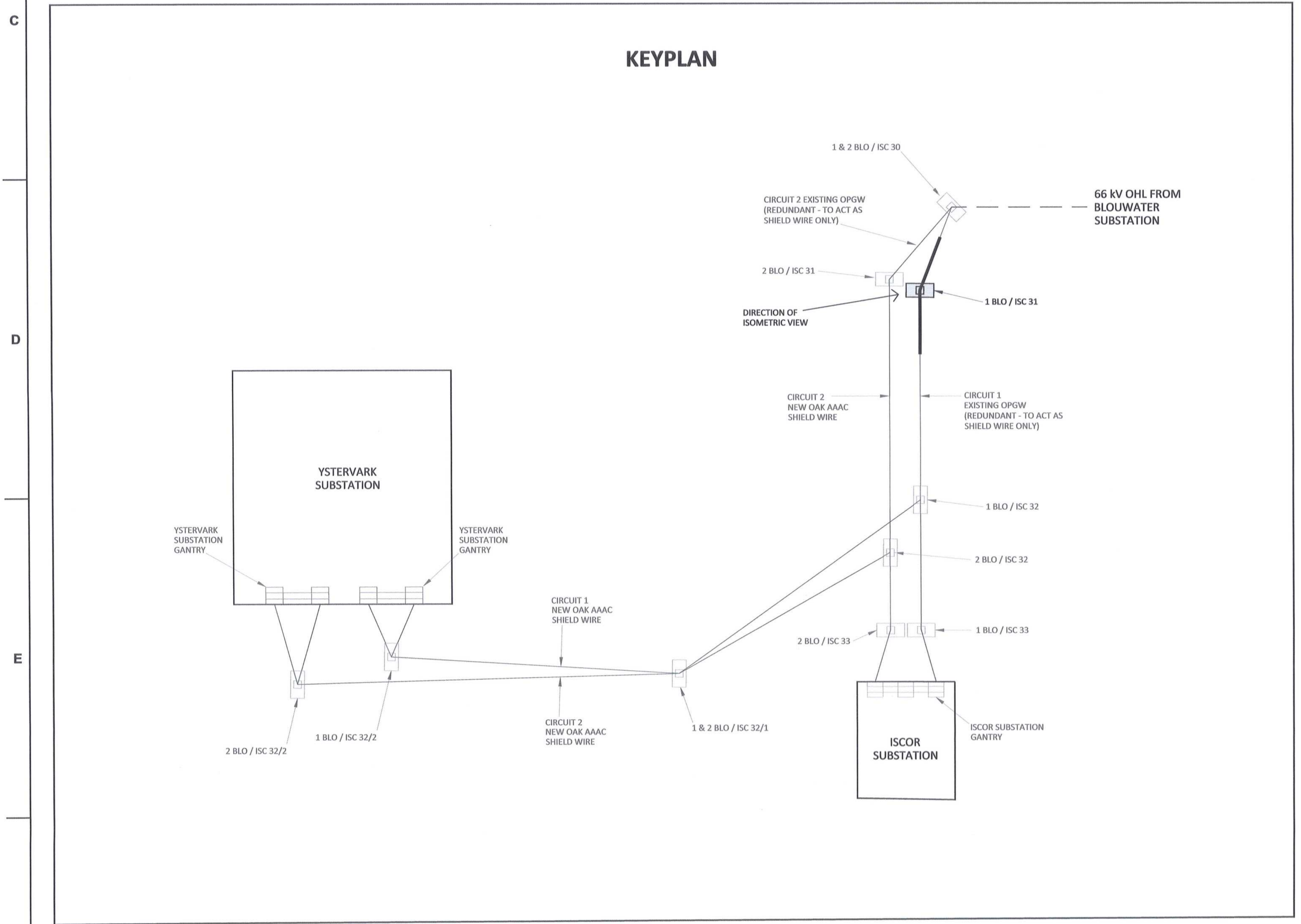
DRAWING NO.	REFERENCE

**REFERENCE DRAWINGS**

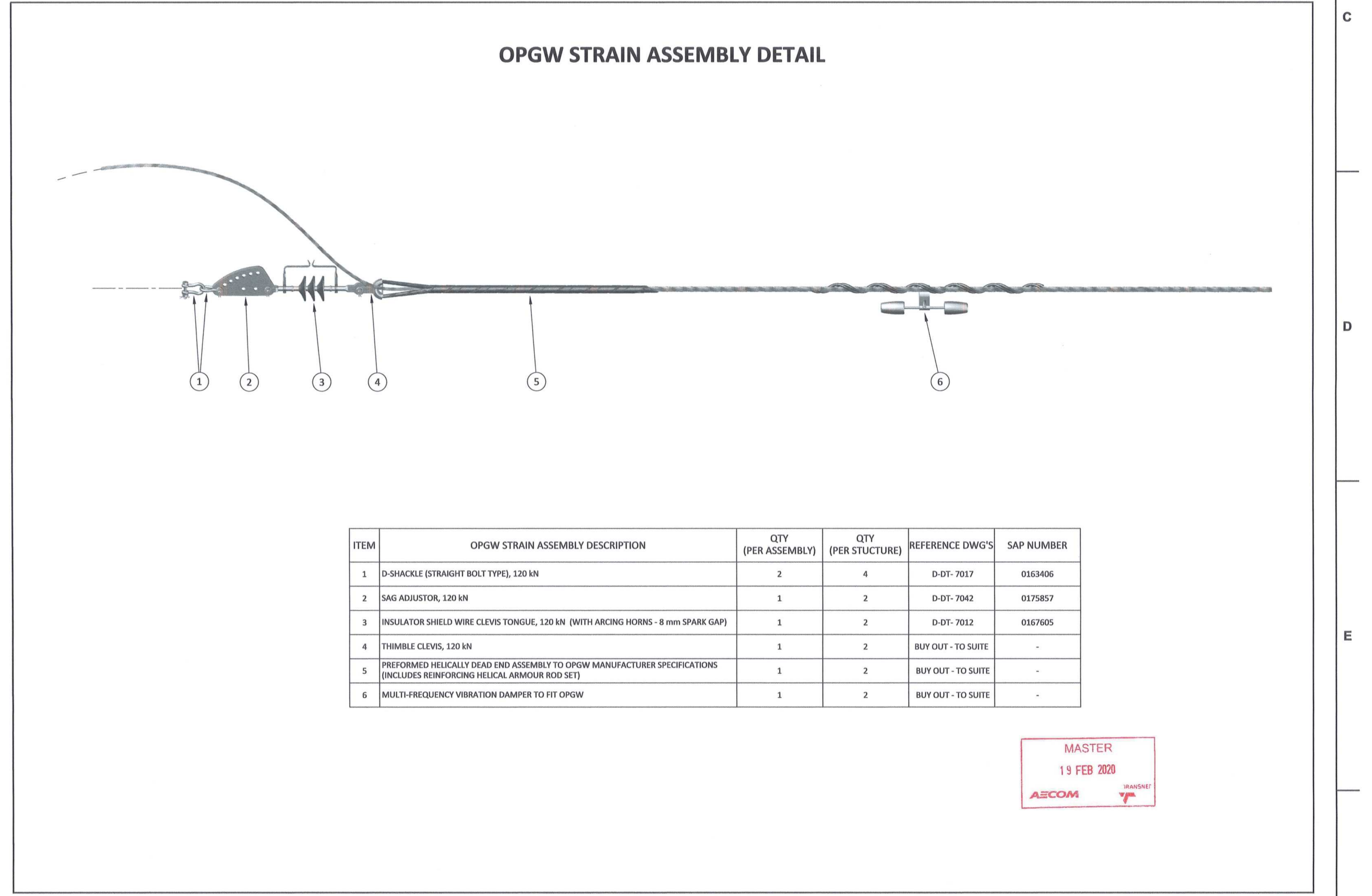




**OPGW STRAIN CONFIGURATION (ISOMETRIC VIEW)**



**KEYPLAN**



**OPGW STRAIN ASSEMBLY DETAIL**

ITEM	OPGW STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	4	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	2	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN (WITH ARCING HORNS - 8 mm SPARK GAP)	1	2	D-DT-7012	0167605
4	THIMBLE CLEVIS, 120 kN	1	2	BUY OUT - TO SUITE	-
5	PERFORMED HELICALLY DEAD END ASSEMBLY TO OPGW MANUFACTURER SPECIFICATIONS (INCLUDES REINFORCING HELICAL ARMOUR ROD SET)	1	2	BUY OUT - TO SUITE	-
6	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OPGW	1	2	BUY OUT - TO SUITE	-

MASTER  
19 FEB 2020  
ASCOM

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**  
 1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
 2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

REVISIONS					
NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DO	CP	CP	2020-02-17

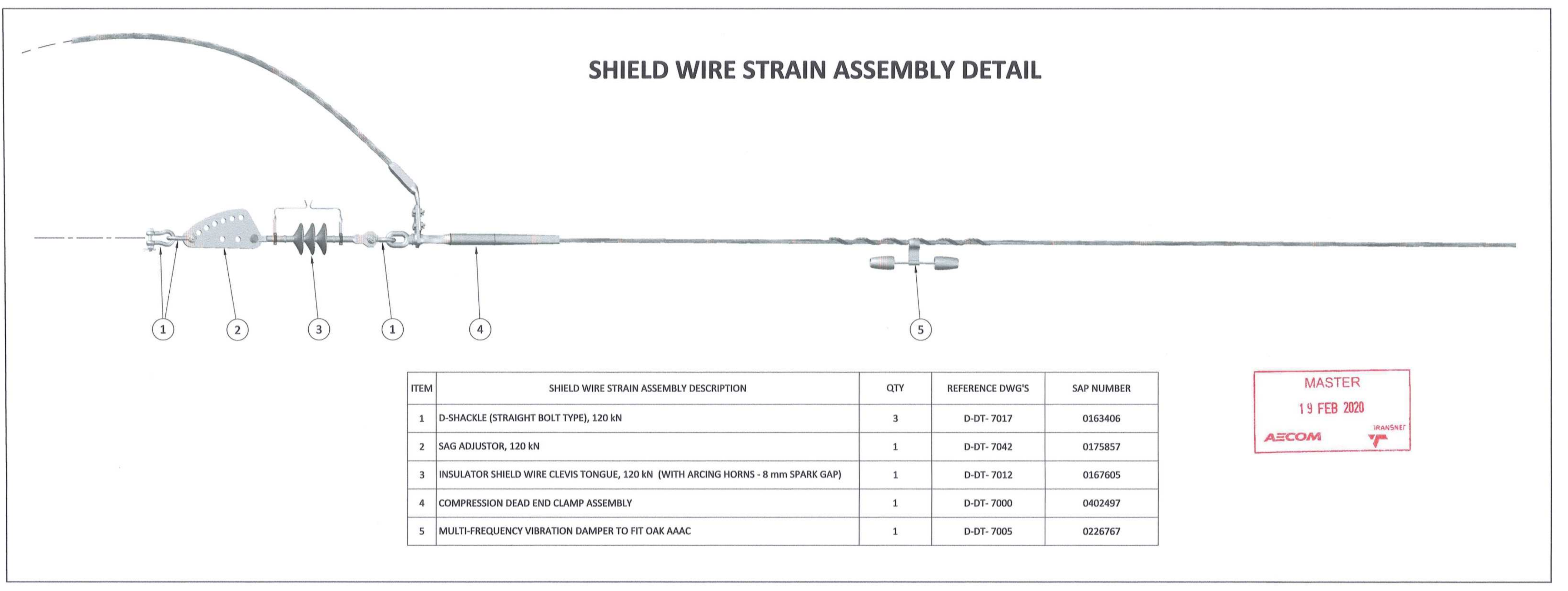
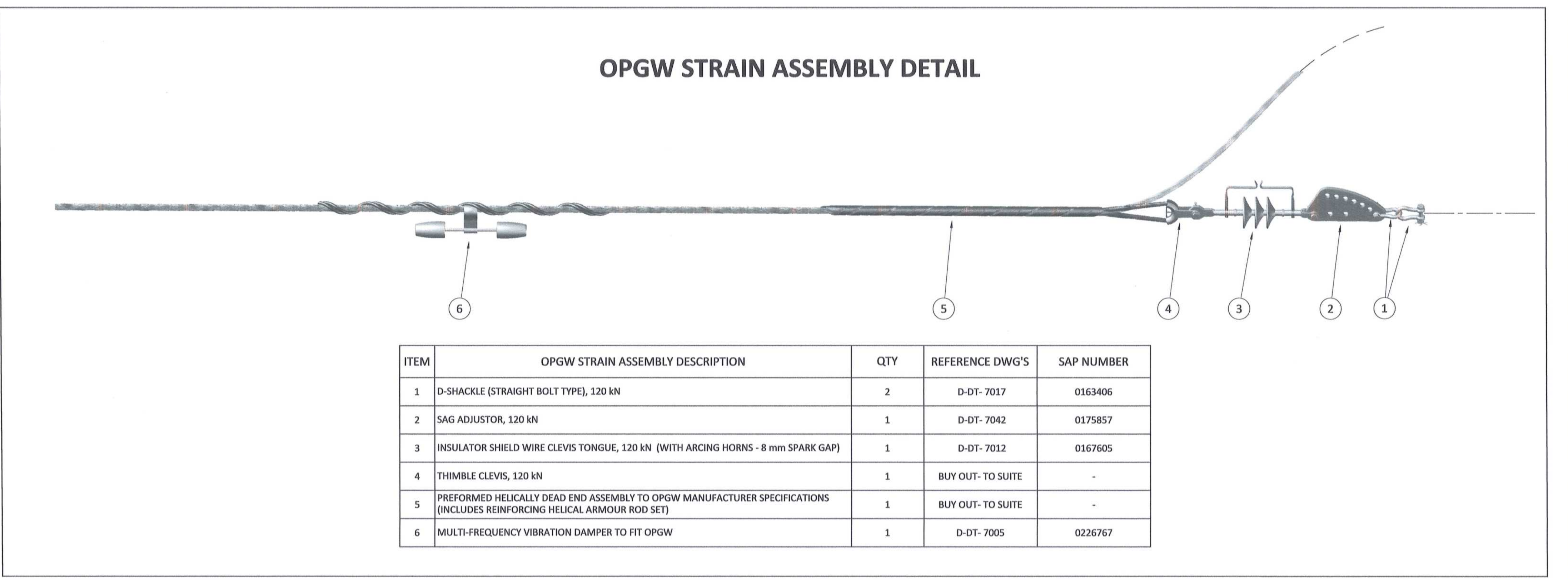
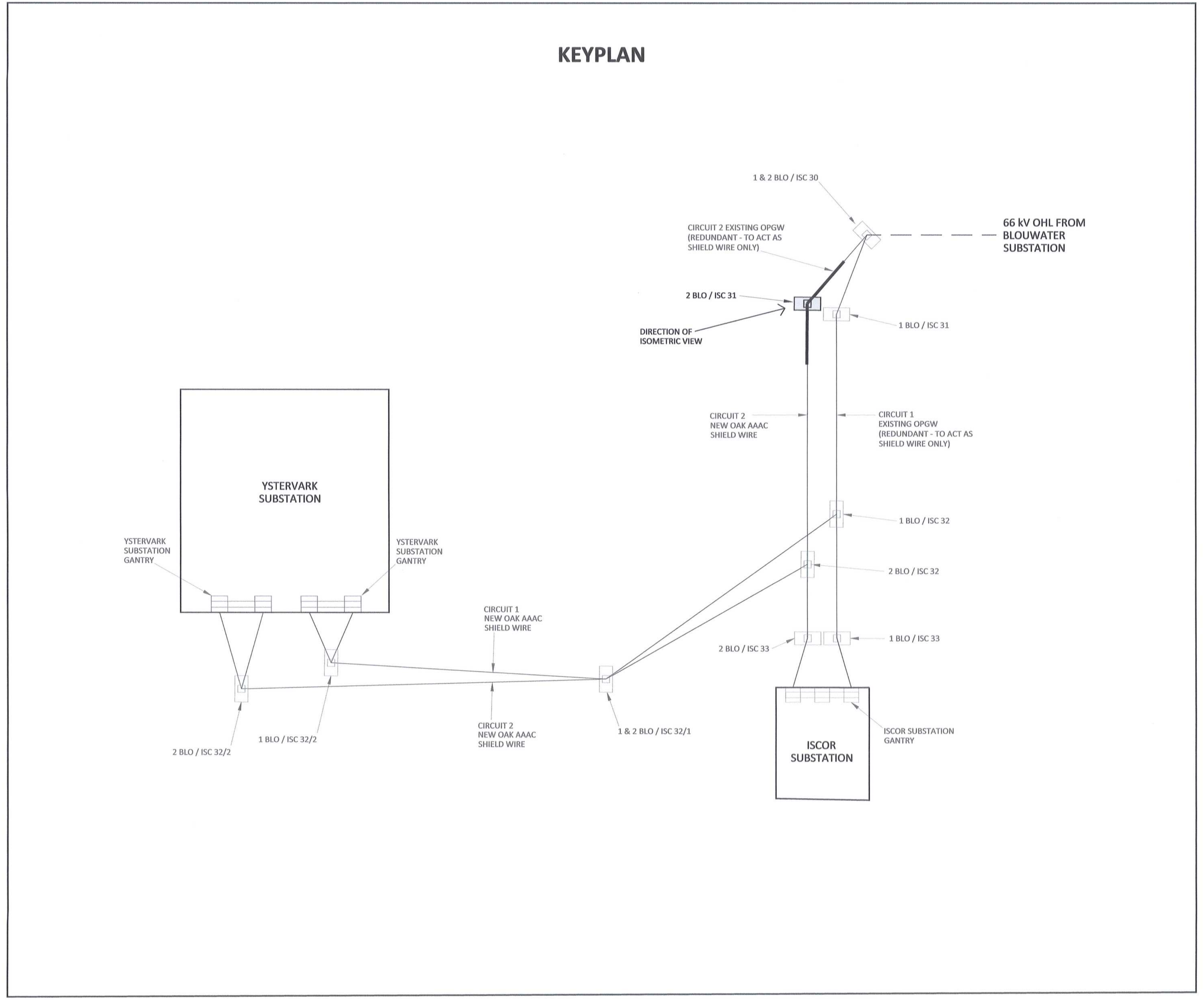
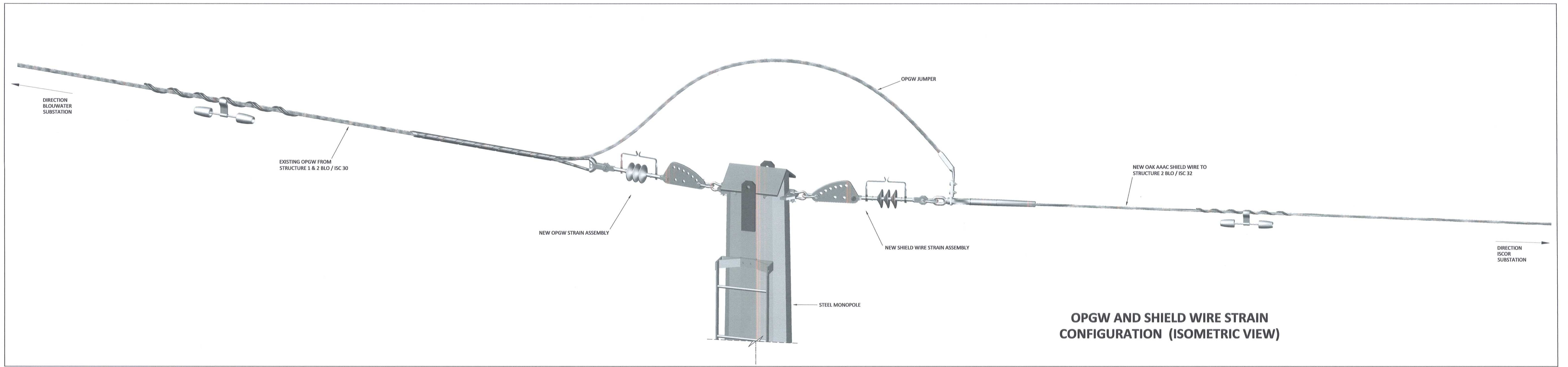
CONTRACTOR / CONSULTANT			TRANSNET CAPITAL PROJECTS		
TITLE	NAME	DATE	TITLE	NAME	DATE
OPERATING DIVISIONS					
PR. ENGR. / PR. TECH. / PR. ARCH			PR. ENGR. / PR. TECH. / PR. ARCH		
NAME	C. P. M.	DATE	NAME	C. P. M.	DATE
SIGNATURE		20/02/17	SIGNATURE		20/02/17
REG. NUMBER	20/270125		REG. NUMBER	20/270125	
SCALE:	N.T.S.		SCALE:	N.T.S.	

Transnet Capital Projects  
 193 LUY'S KRIGGE DRIVE, PLATTELOOF, 8001  
 TEL: 021 945 1999  
 FAX: 086 677 2455

**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT  
 BULK POWER UPGRADE :  
 66 kV BRANCH LINE MASTS - 1 BLO / ISC 31  
 OPGW STRAIN CONFIGURATION**

PROJECT NUMBER	ISS	FBS	DHS	TYPE	DRAWING NO.	SHEET	REV	ID
IA01924701	1	2	3	00	E	DE	0067	0100



DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NERC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	BS	RS	2020-02-17

**REVISIONS**

This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for the intended purpose.

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	[Signature]	20/02/17				
CHECKED	KS	[Signature]	20/02/17				
DESIGNED	NM	[Signature]	20/02/17				
CHECKED	CP	[Signature]	20/02/17				

OPERATING DIVISIONS				PRELNG. / PR. TECH. / PR. ARCH			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE

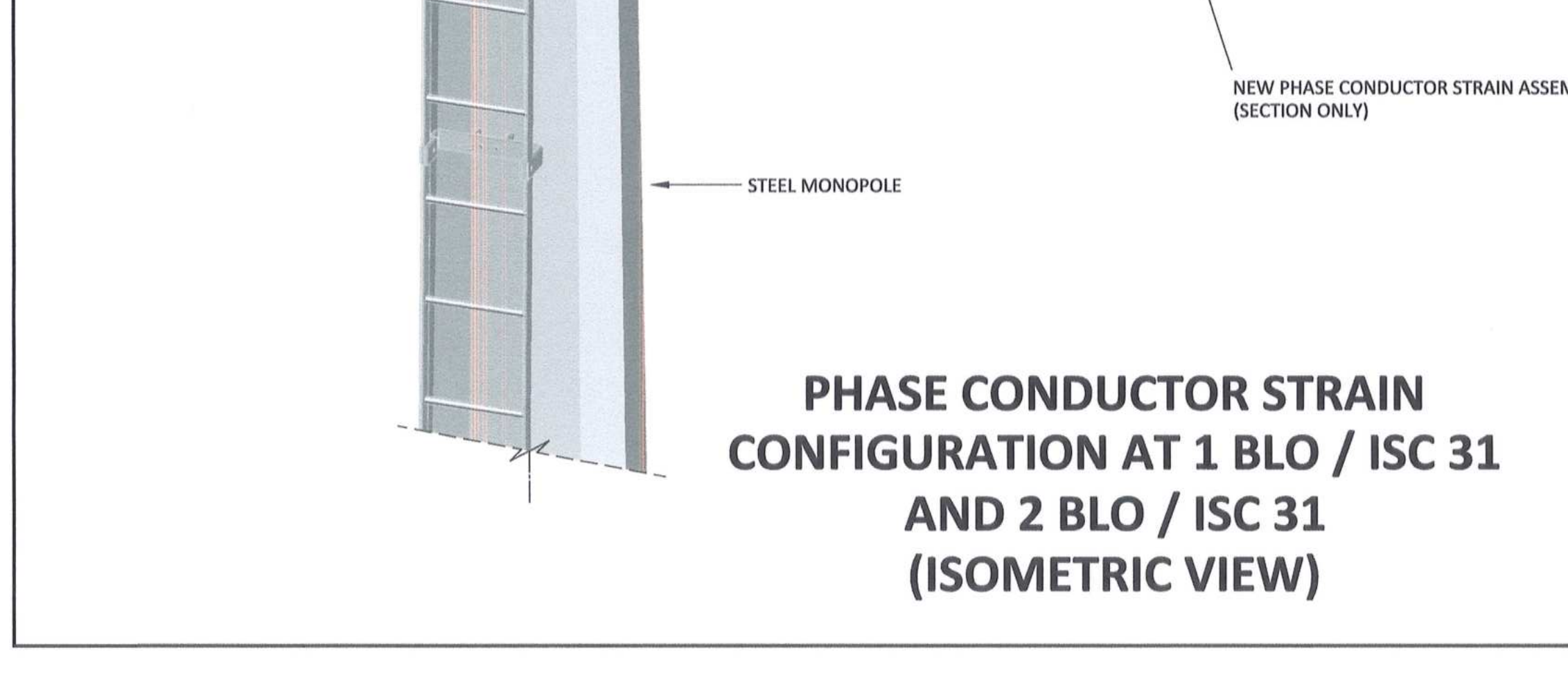
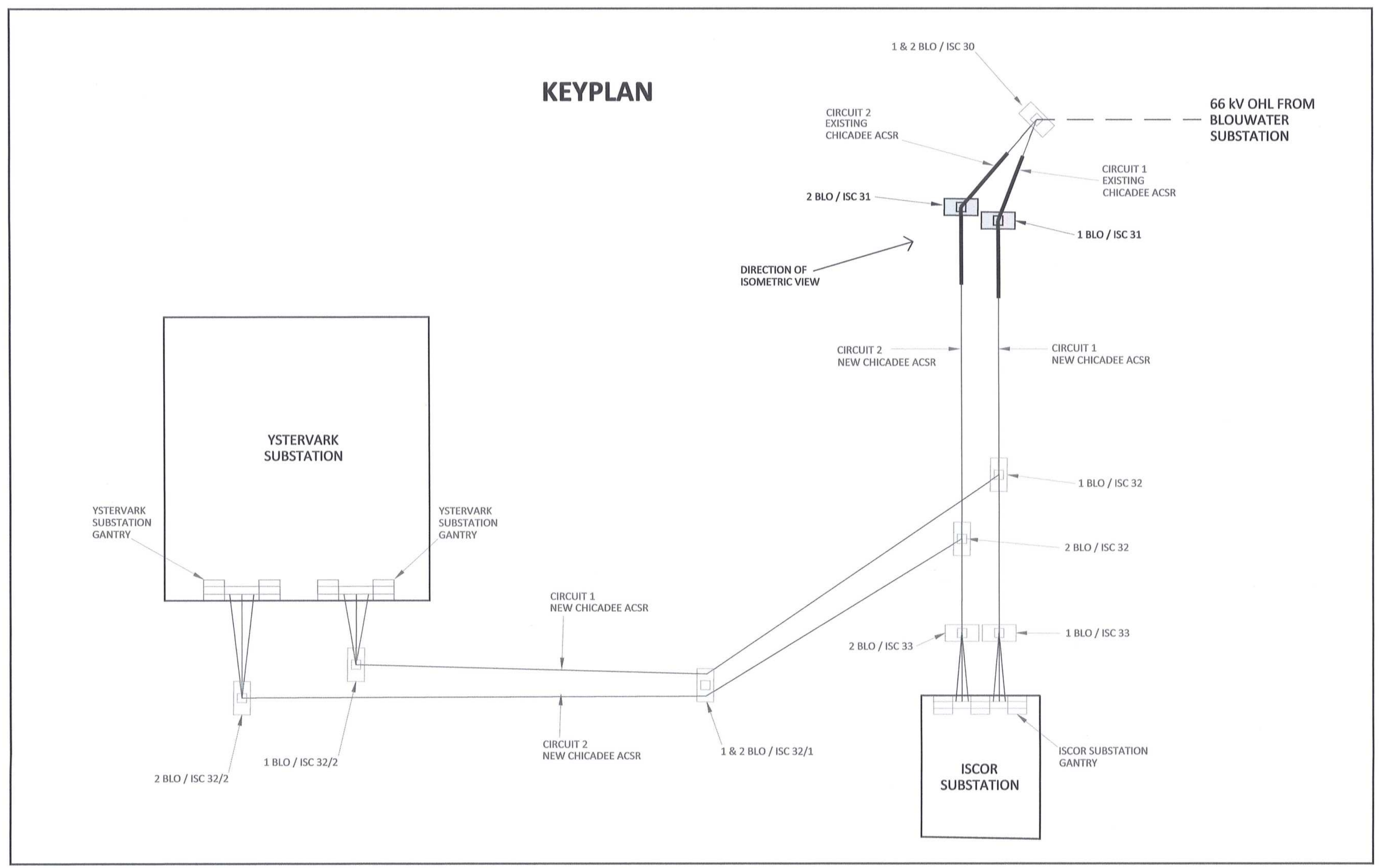
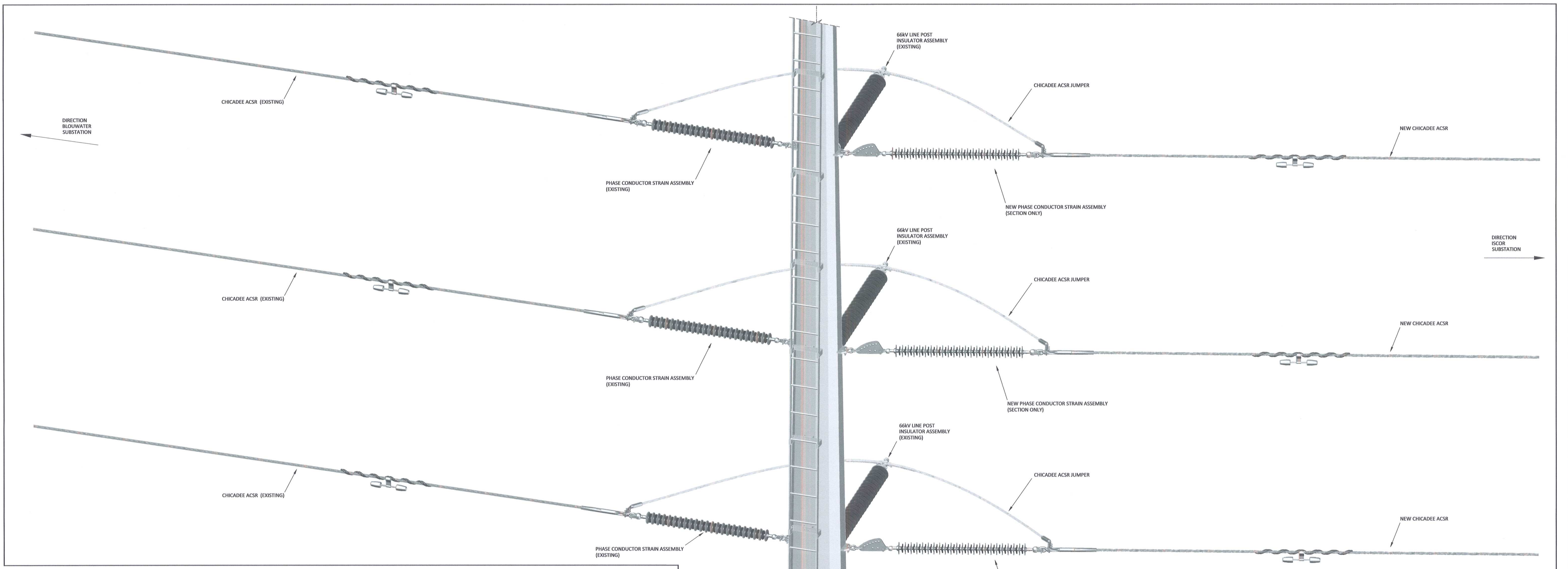
Transnet Capital Projects

TRANSNET

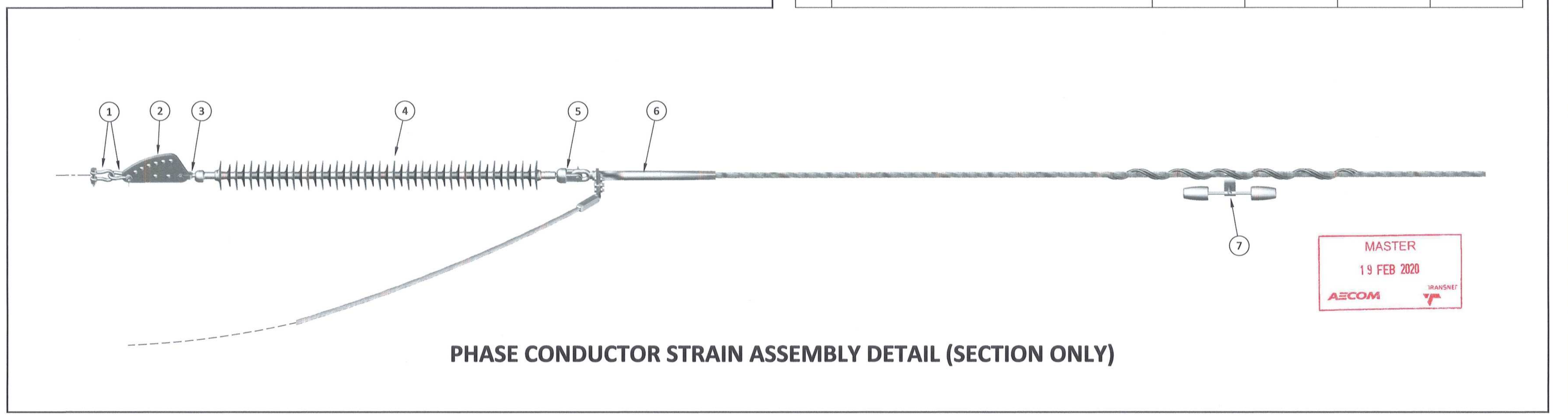
PORT OF SALDANHA

IRON ORE TIPLER 3 PROJECT  
BULK POWER UPGRADE :  
66 KV BRANCH LINE MASTS - 2 BLO / ISC 31  
OPGW AND SHIELD WIRE STRAIN CONFIGURATION

PROJECT NUMBER	DO	FBS	DIB	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	3	0	E	DE	06	8	0100AE



ITEM	PHASE CONDUCTOR STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	6	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	3	D-DT-7042	0175857
3	CLEVIS BALL, 120 kN	1	3	D-DT-6059	0222125
4	INSULATOR (LONG ROD), 66kV, 31mm/kV, 120 kN	1	3	D-DT-7029	0167609
5	SOCKET CLEVIS, 120 kN	1	3	D-DT-7021	0010259
6	COMPRESSION DEAD END CLAMP ASSEMBLY	1	3	D-DT-7000	0168745
7	MULTI-FREQUENCY VIBRATION DAMPER TO FIT CHICADEE ACSR	1	3	D-DT-7005	0168960



MASTER  
19 FEB 2020  
AECOM

**NOTES**  
1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

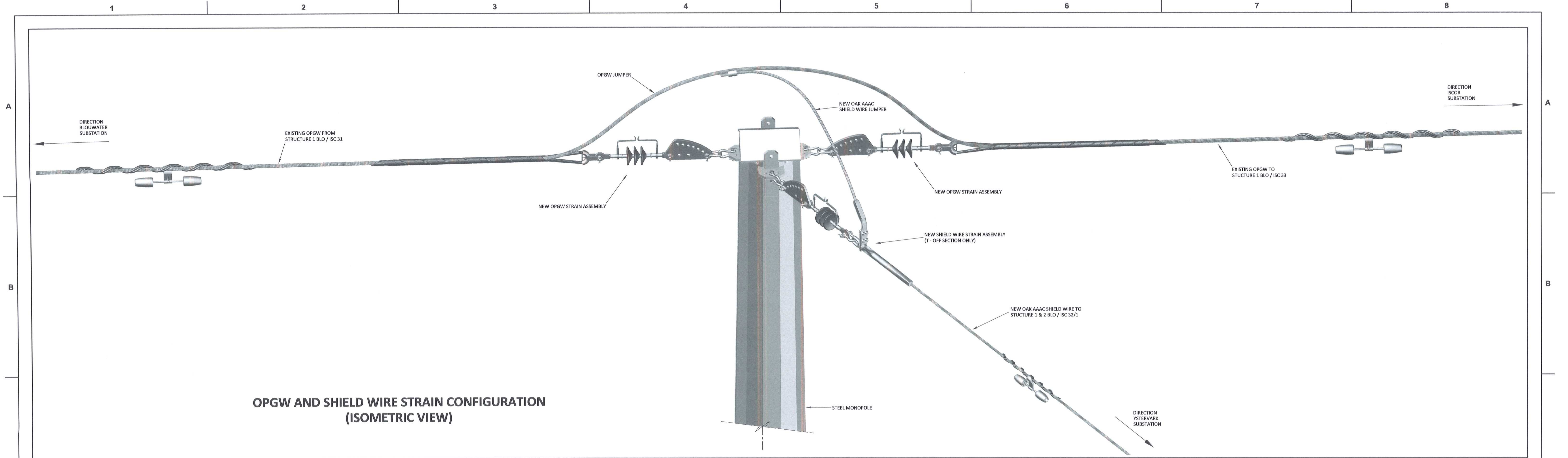
DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	CP	CP	2020-02-17

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	[Signature]	20/02/17	PRELNG. / PR. TECH. / PR. ARCH	C PFM		
CHECKED	KS	[Signature]	20/02/17	SIGNATURE	[Signature]		20/02/17
DESIGNED	NM	[Signature]	20/02/17	REG. NUMBER	20220126		
CHECKED	CP	[Signature]	20/02/17	SCALE	N.T.S.		

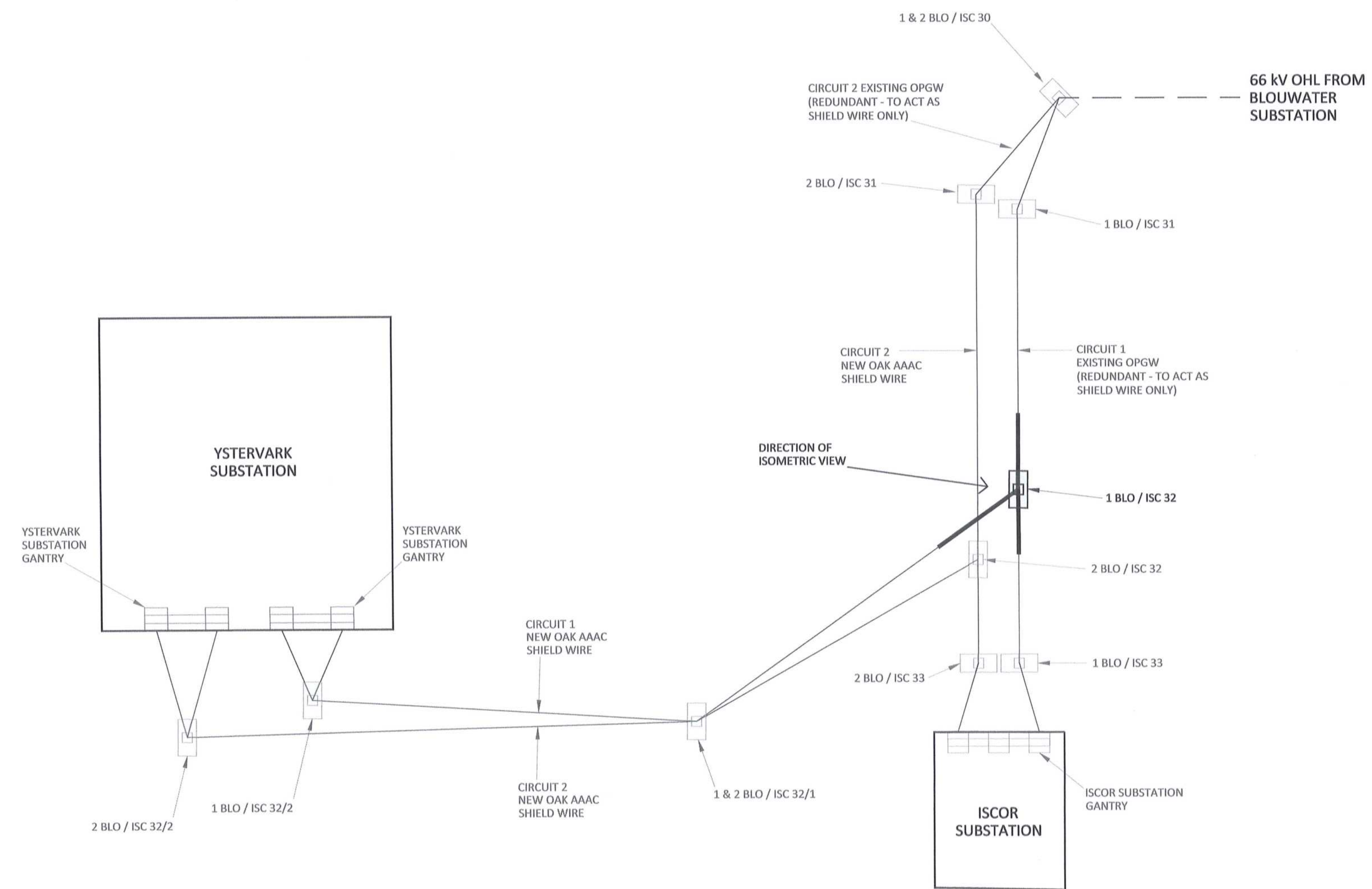
Transnet Capital Projects  
 TRANSNET  
 PORT OF SALDANHA  
 IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE :  
 66 kV BRANCH LINE MASTS :  
 1 BLO / ISC 31 AND 2 BLO / ISC 31  
 PHASE CONDUCTOR STRAIN CONFIGURATION

PROJECT NUMBER	DOB	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
19024701	2	3	0	E	DE	06	9	0100

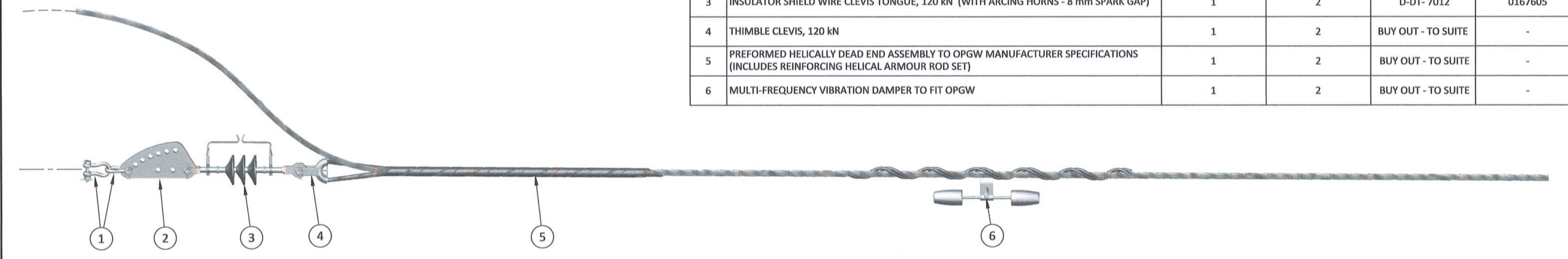


**OPGW AND SHIELD WIRE STRAIN CONFIGURATION  
(ISOMETRIC VIEW)**

**KEYPLAN**

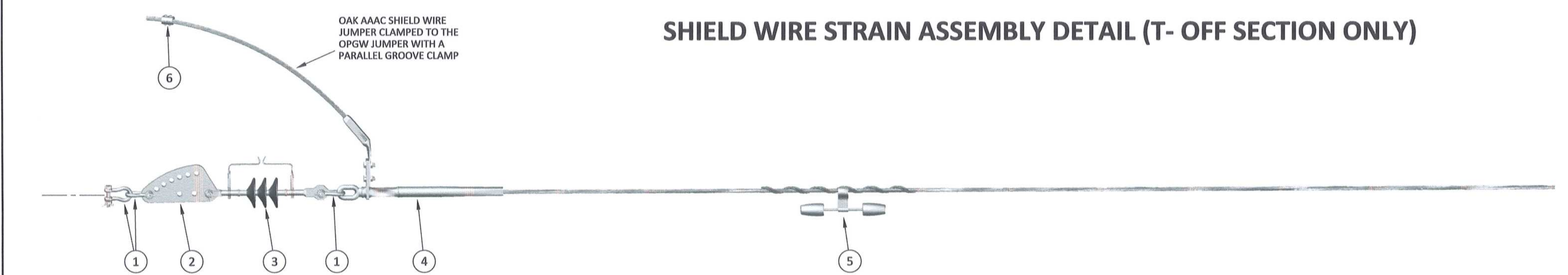


**OPGW STRAIN ASSEMBLY DETAIL**



ITEM	OPGW STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	4	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	2	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN (WITH ARCING HORNS - 8 mm SPARK GAP)	1	2	D-DT-7012	0167605
4	THIMBLE CLEVIS, 120 kN	1	2	BUY OUT - TO SUITE	-
5	PREFORMED HELICALLY DEAD END ASSEMBLY TO OPGW MANUFACTURER SPECIFICATIONS (INCLUDES REINFORCING HELICAL ARMOUR ROD SET)	1	2	BUY OUT - TO SUITE	-
6	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OPGW	1	2	BUY OUT - TO SUITE	-

**SHIELD WIRE STRAIN ASSEMBLY DETAIL (T-OFF SECTION ONLY)**



ITEM	SHIELD WIRE STRAIN ASSEMBLY DESCRIPTION	QTY	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	3	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN (WITH ARCING HORNS - 8 mm SPARK GAP)	1	D-DT-7012	0167605
4	COMPRESSION DEAD END CLAMP ASSEMBLY	1	D-DT-7000	0402497
5	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OAK AAAC	1	D-DT-7005	0226767
6	PARALLEL GROOVE CLAMP - ALUMINIUM (CONDUCTOR RANGE 6.6 - 18.9 mm)	1	BUY OUT - TO SUITE	-

**MASTER**  
19 FEB 2020  
AECOM TRANSNET

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

REVISIONS			
NO.	DESCRIPTION	BY	DATE
00	ISSUED FOR CONSTRUCTION	DO	2020-02-17

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE	TITLE
DO		20	02	17			
HS		20	02	17			
NM		20	02	17			
CP		20	02	17			

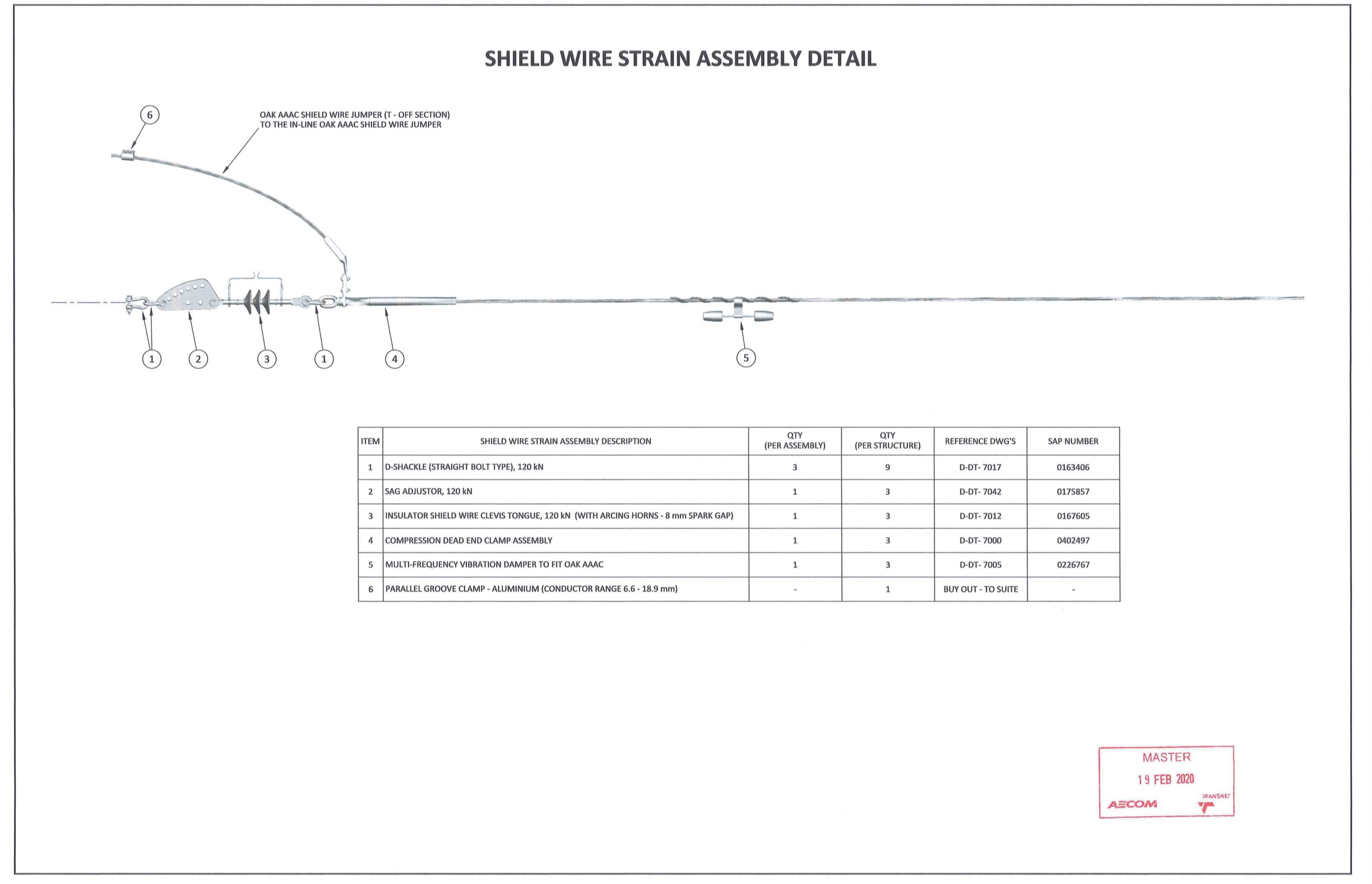
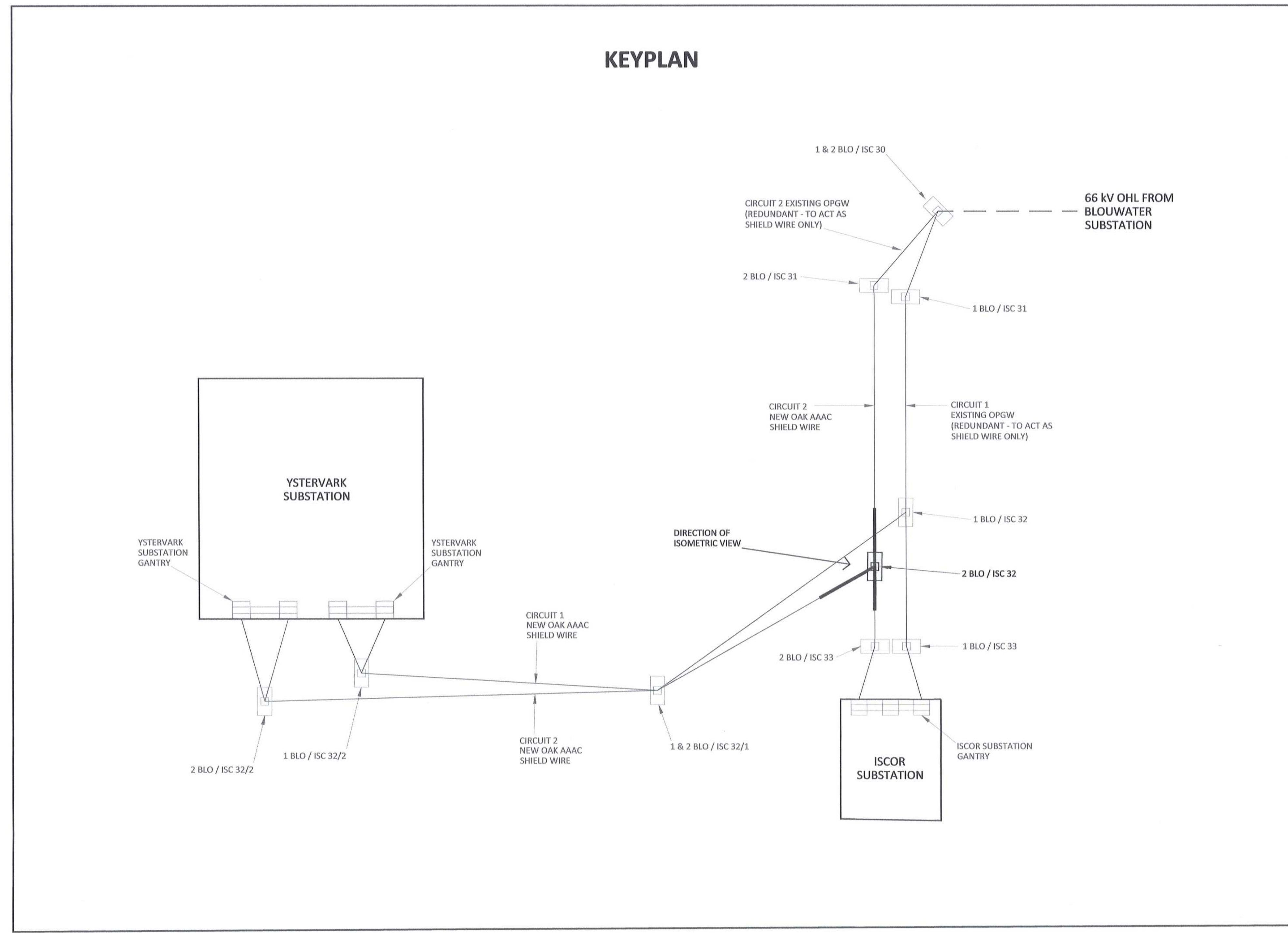
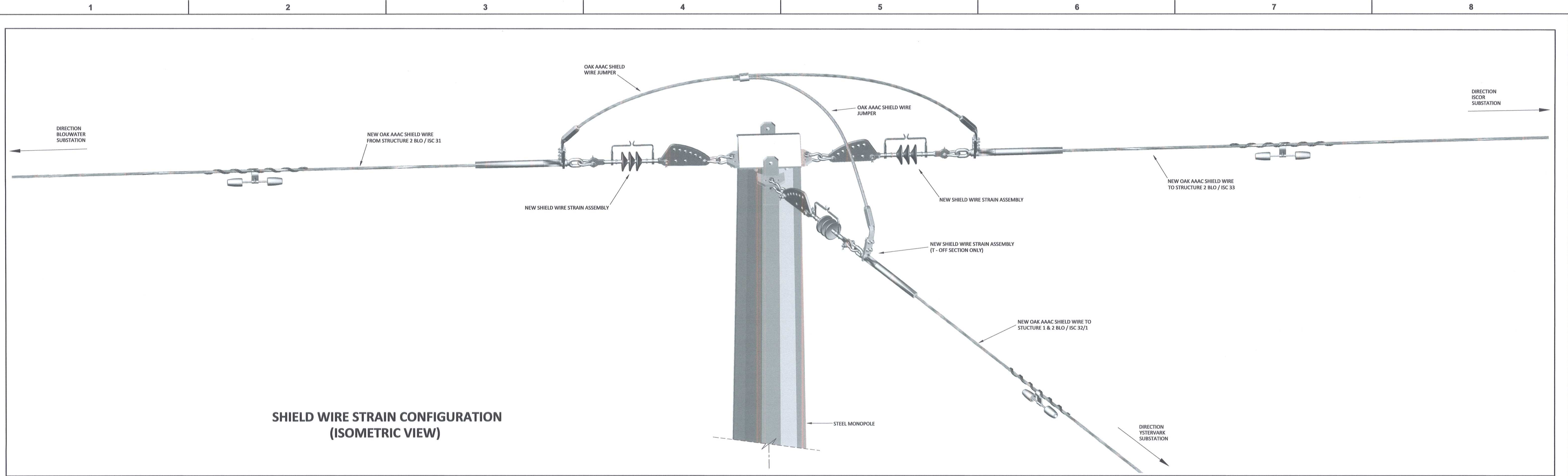
**TRANSNET**  
Transnet Capital Projects  
193 LUYK KIRGE DRIVE, PLATTENKOP, 8001  
TEL: 021 945 1999  
FAX: 021 947 2455

**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT  
BULK POWER UPGRADE :  
66 kV BRANCH LINE MASTS - 1 BLO / ISC 32  
OPGW AND SHIELD WIRE STRAIN CONFIGURATION**

PROJECT NUMBER	DO	FBS	DHS	TYPE	DRAWING NO.	SHEET	REV	ID
19024701	2	3	0	E	DE	007	0	100

SCALE: N.T.S.



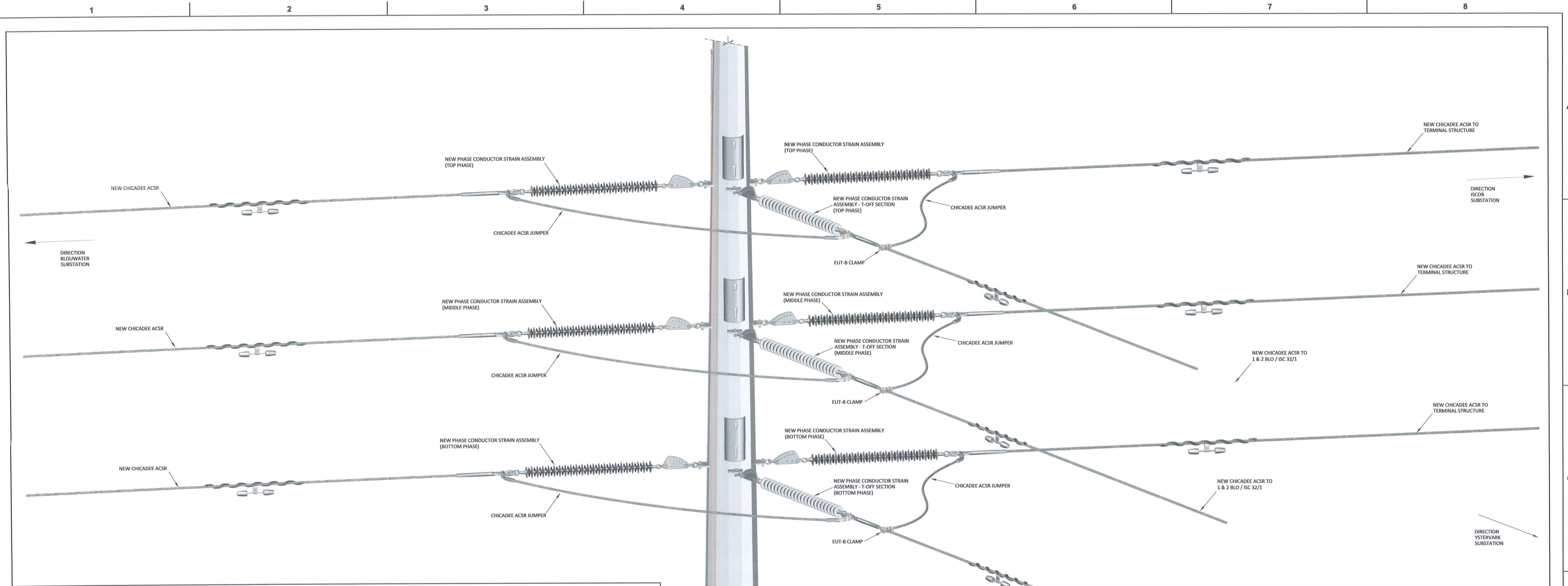
MASTER  
19 FEB 2020  
AECOM

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

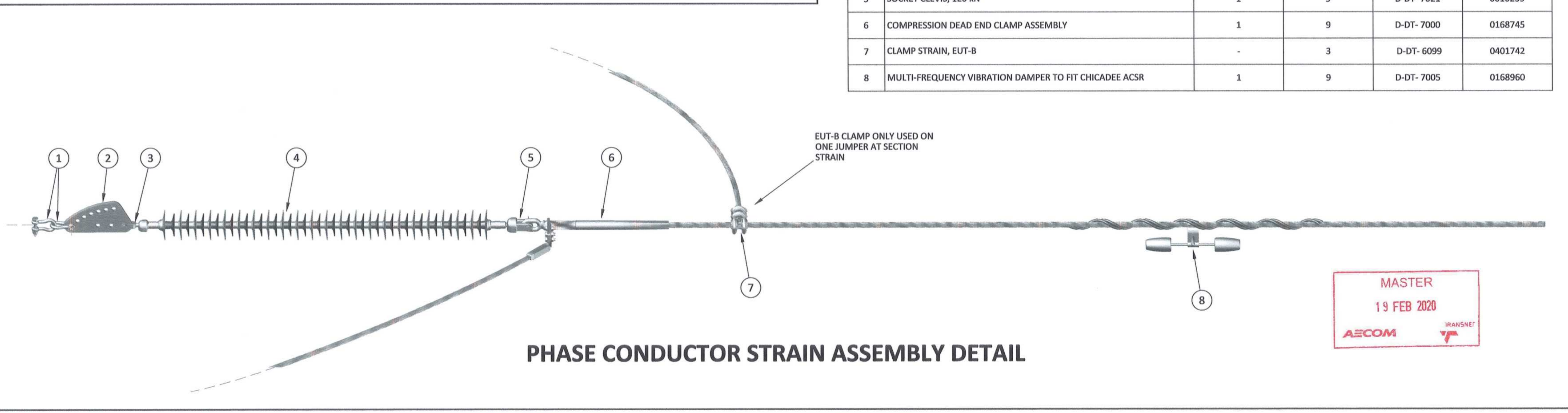
DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	20	02	17			
CHECKED	KS	20	02	17			
DESIGNED	NM	20	02	17			
CHECKED	CP	20	02	17			
OPERATING DIVISIONS				PRELNG. / PR. TECH. / PR. ARCH			
TITLE	NAME	SIGN	DATE	NAME	DATE		
ISSUED FOR CONSTRUCTION	DD	CP	CP	2020-02-17			
NO.	DESCRIPTION	BY	CHKD	APPD	DATE		
REVISIONS							
This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.							
SCALE: N.T.S.				PROJECT NUMBER: 1924701-2-300-ED-00710100-AE			



**PHASE CONDUCTOR STRAIN CONFIGURATION AT 1 BLO / ISC 32 AND 2 BLO / ISC 32 (ISOMETRIC VIEW)**

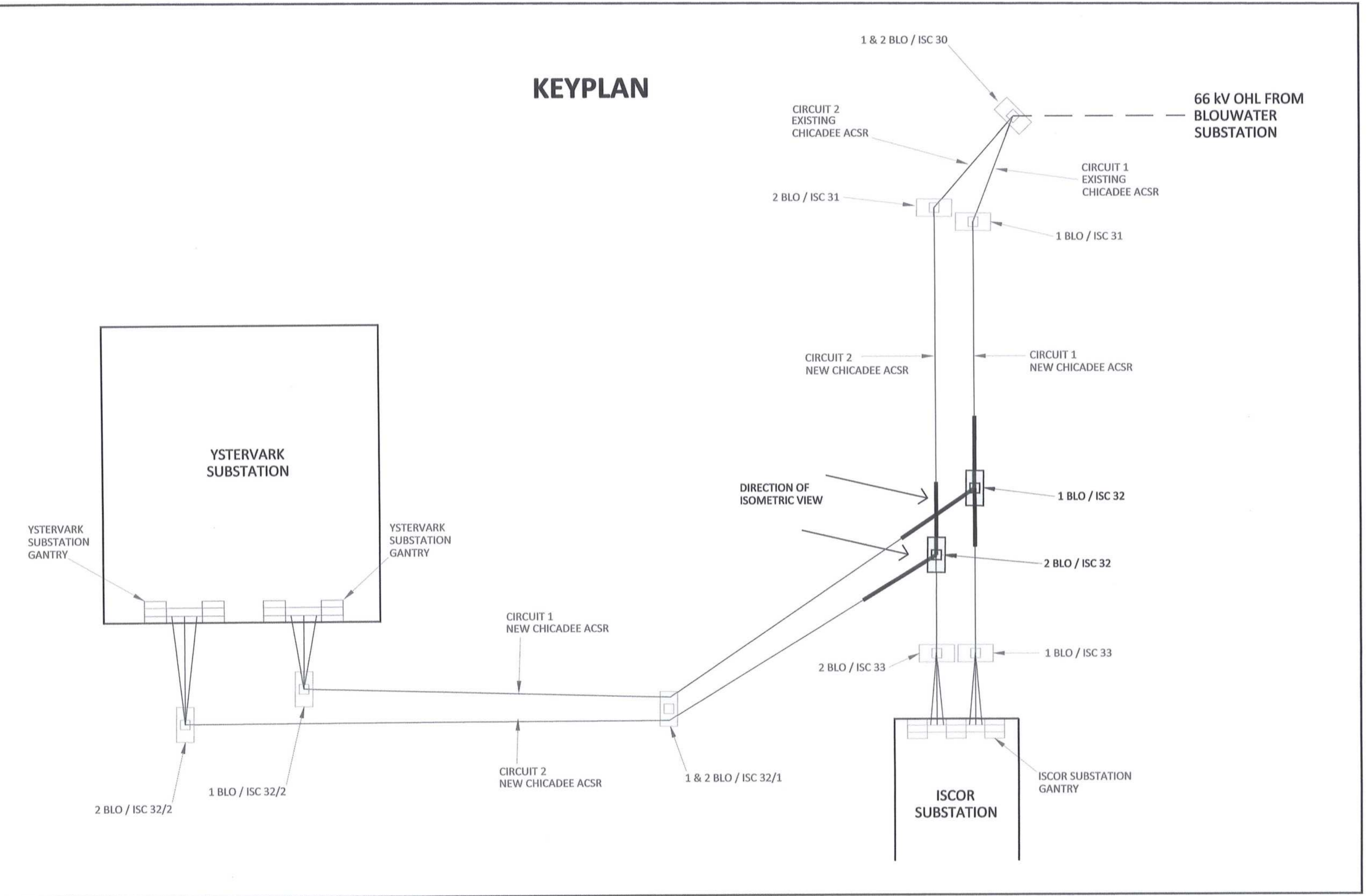
ITEM	PHASE CONDUCTOR STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	18	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	9	D-DT-7042	0175857
3	CLEVIS BALL, 120 kN	1	9	D-DT-6059	0222125
4	INSULATOR (LONG ROD), 66kV, 31mm/kV, 120 kN	1	9	D-DT-7029	0167609
5	SOCKET CLEVIS, 120 kN	1	9	D-DT-7021	0010259
6	COMPRESSION DEAD END CLAMP ASSEMBLY	1	9	D-DT-7000	0168745
7	CLAMP STRAIN, EUT-B	-	3	D-DT-6099	0401742
8	MULTI-FREQUENCY VIBRATION DAMPER TO FIT CHICADEE ACSR	1	9	D-DT-7005	0168960



**PHASE CONDUCTOR STRAIN ASSEMBLY DETAIL**

MASTER  
19 FEB 2020  
AECOM

**KEYPLAN**



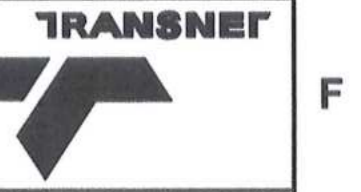
**NOTES**  
1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

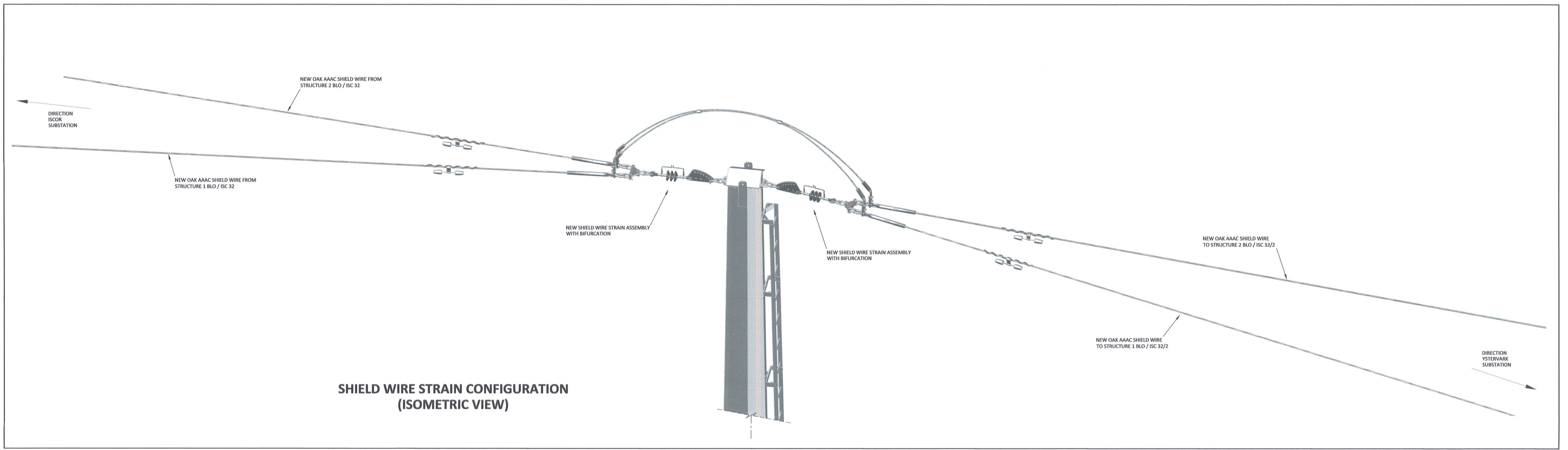
NO.	DESCRIPTION	ISSUED FOR CONSTRUCTION	DD	CP	CP	2020-02-17
00	ISSUED FOR CONSTRUCTION	DD	CP	CP	2020-02-17	

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD		20/02/17				
CHECKED	KS		20/02/17				
DESIGNED	NM		20/02/17				
CHECKED	CP		20/02/17				

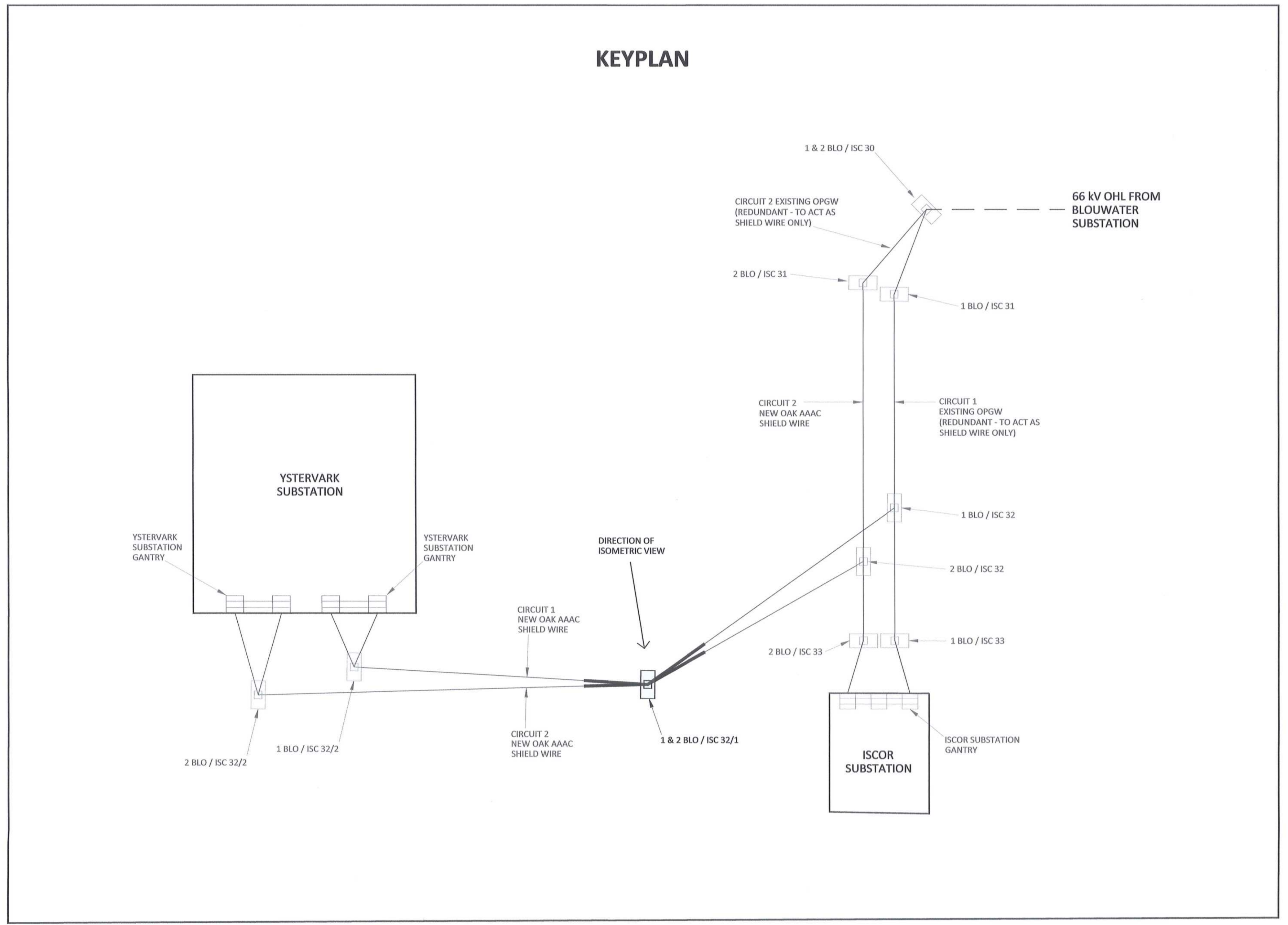
Transnet Capital Projects  
**PORT OF SALDANHA**  
 IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE :  
 66 kV BRANCH LINE MASTS -  
 1 BLO / ISC 32 AND 2 BLO / ISC 32  
 PHASE CONDUCTOR STRAIN CONFIGURATION



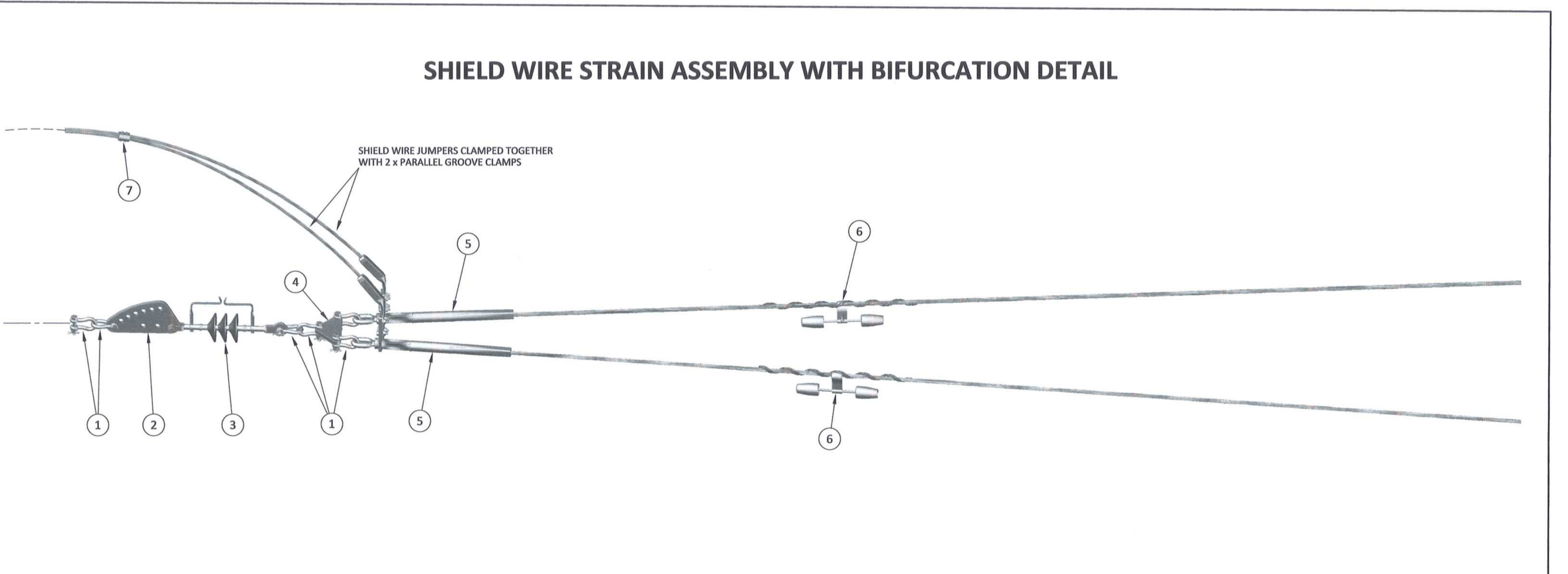
PROJECT NUMBER	DD	FBS	DIB	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	3	0	E	DE-0072	01	00	AE



**SHIELD WIRE STRAIN CONFIGURATION  
(ISOMETRIC VIEW)**



**KEYPLAN**



**SHIELD WIRE STRAIN ASSEMBLY WITH BIFURCATION DETAIL**

ITEM	SHIELD WIRE STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	6	12	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	2	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN [WITH ARCING HORNS - 8 mm SPARK GAP]	1	2	D-DT-7012	0167605
4	YOKE PLATE - TRIANGLE, 120kN	1	2	D-DT-7015	0168861
5	COMPRESSION DEAD END CLAMP ASSEMBLY	2	4	D-DT-7000	0402497
6	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OAK AAAC	2	4	D-DT-7005	0226767
7	PARALLEL GROOVE CLAMP - ALUMINIUM (CONDUCTOR RANGE 6.6 - 18.9 mm)	-	2	BUY OUT - TO SUITE	-

MASTER  
19 FEB 2020  
AECOM

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**  
1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

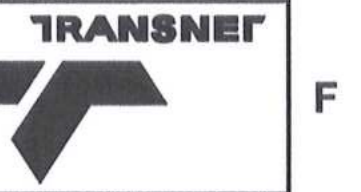
NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	CP	CP	2020-02-17

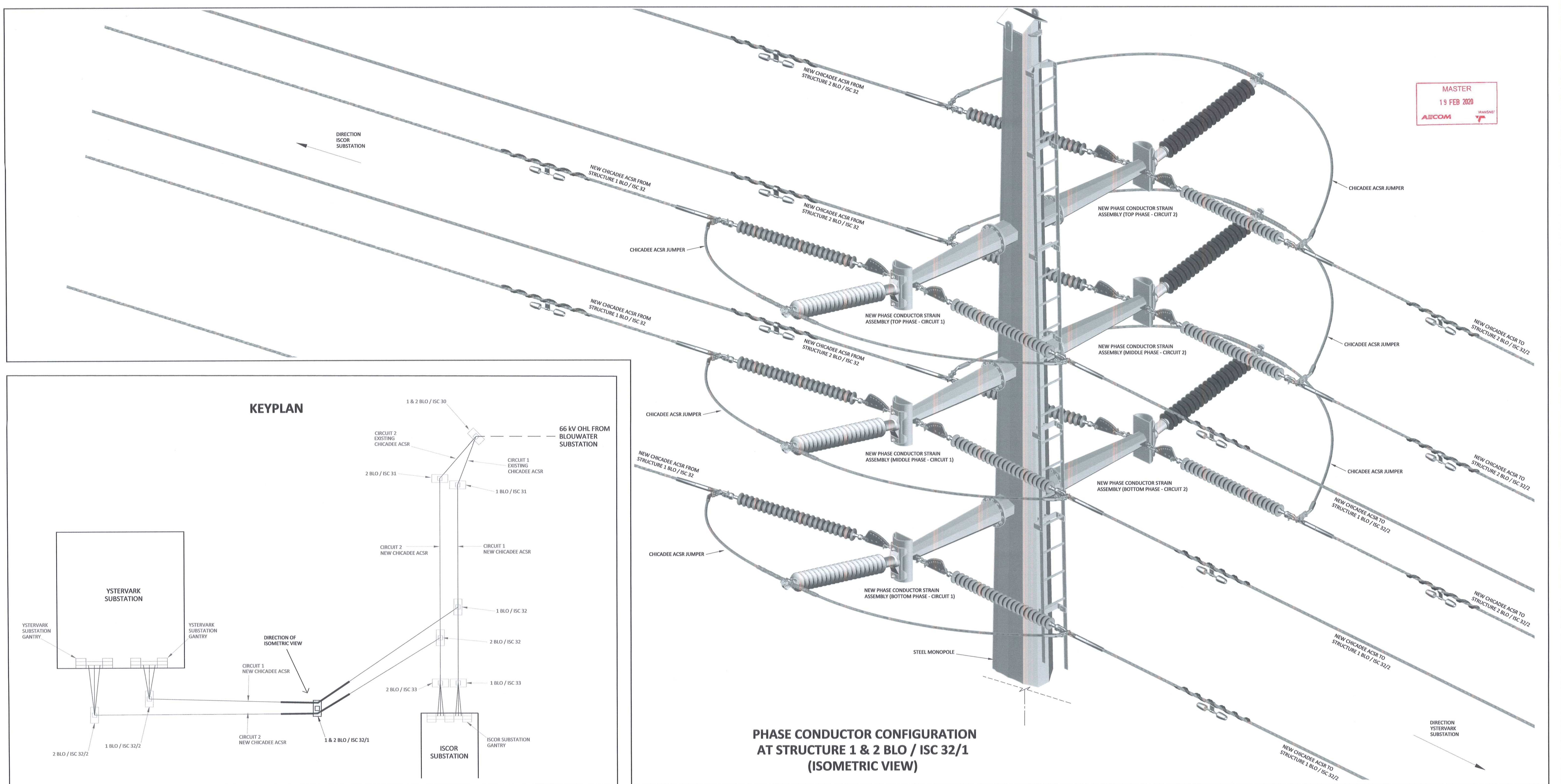
CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	[Signature]	20/02/17				
CHECKED	KS	[Signature]	20/02/17				
DESIGNED	NM	[Signature]	20/02/17				
CHECKED	CP	[Signature]	20/02/17				

OPERATING DIVISIONS				PRELNG. / PR. TECH. / PR. ARCH			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				PRELNG. / PR. TECH. / PR. ARCH	C PYM	[Signature]	20/02/17

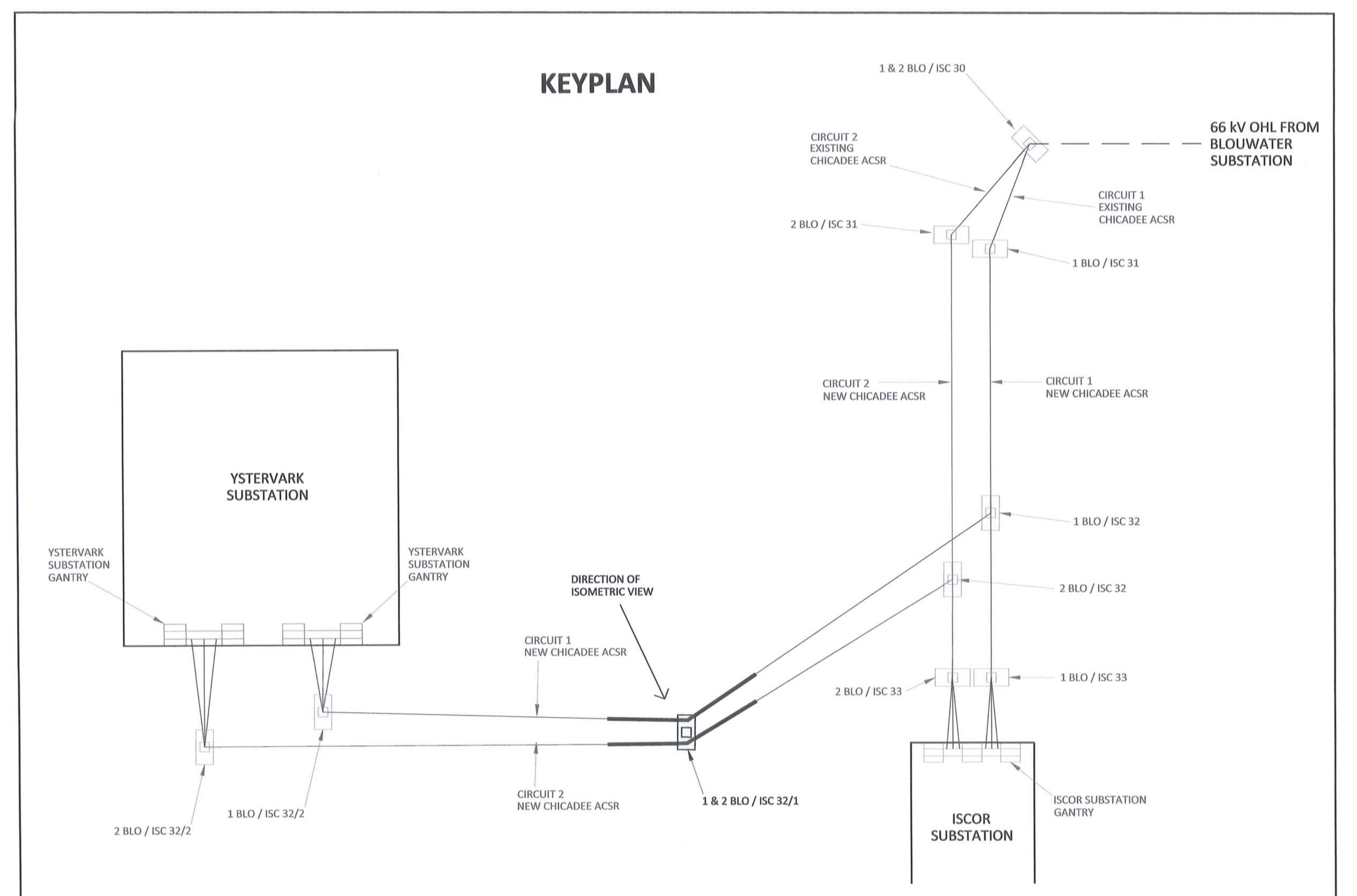
Transnet Capital Projects  
**PORT OF SALDANHA**  
 IRON ORE TIPLER 3 PROJECT  
 BULK POWER UPGRADE :  
 66 kV BRANCH LINE MASTS - 1 & 2 BLO / ISC 32/1  
 SHIELD WIRE STRAIN CONFIGURATION

PROJECT NUMBER: 1924701-2-300-DE-007301-00-AE  
 SHEET: 1 OF 1

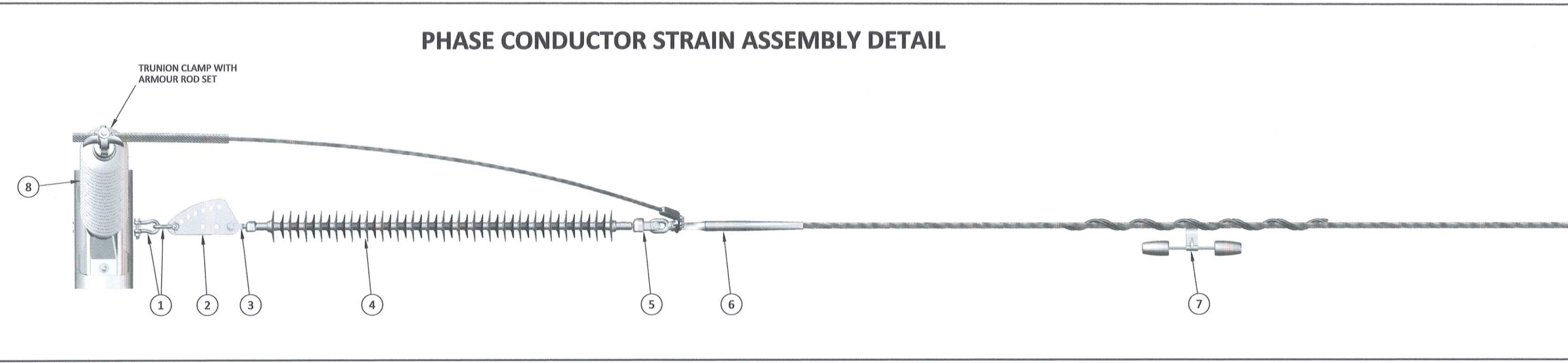
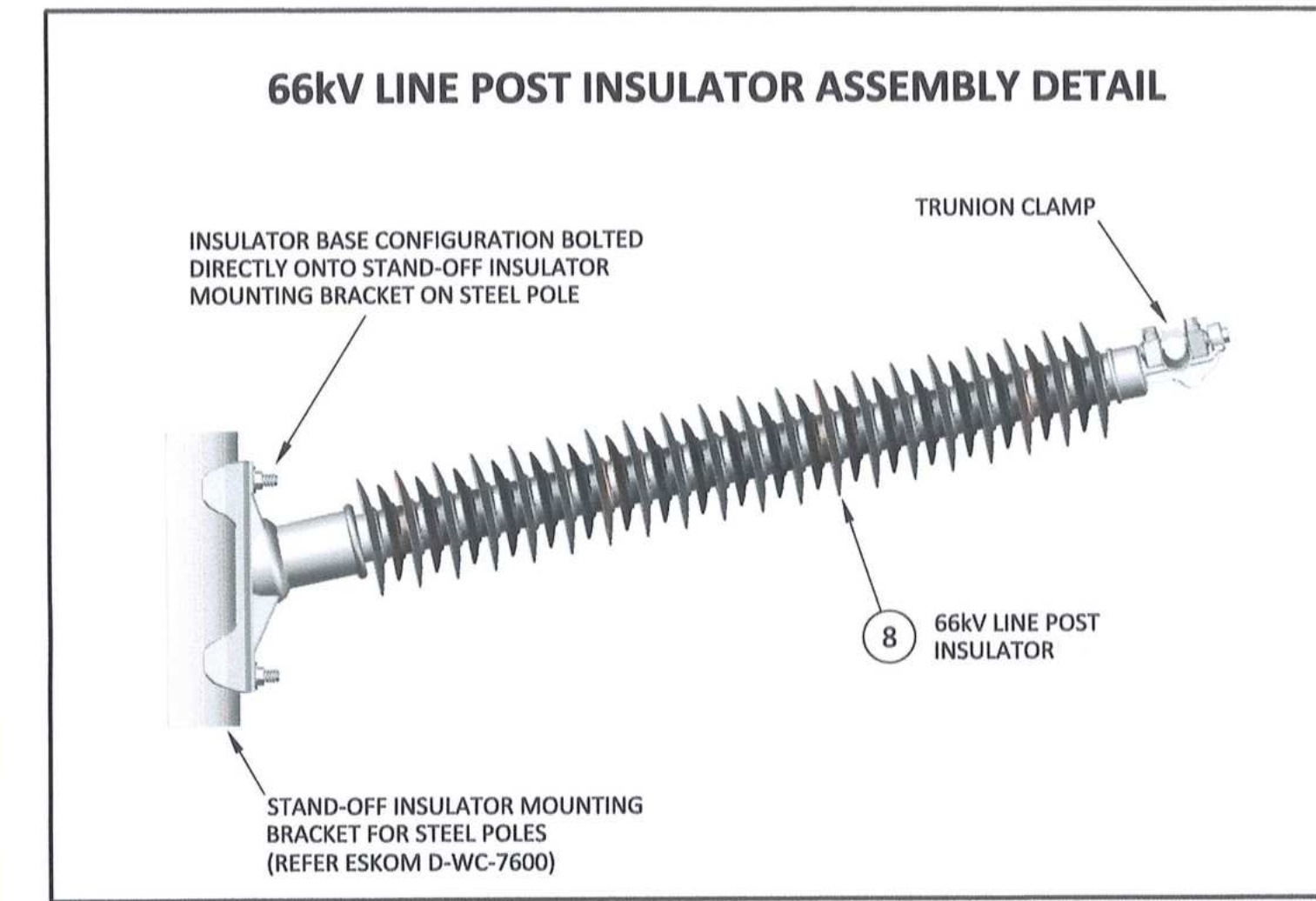




MASTER  
19 FEB 2020  
AECOM TRANSNET



PHASE CONDUCTOR CONFIGURATION AT STRUCTURE 1 & 2 BLO / ISC 32/1 (ISOMETRIC VIEW)



ITEM	PHASE CONDUCTOR STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	24	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	12	D-DT-7042	0175857
3	CLEVIS BALL, 120 kN	1	12	D-DT-6059	0222125
4	INSULATOR (LONG ROD), 66kV, 31mm/kV, 120 kN	1	12	D-DT-7029	0167609
5	SOCKET CLEVIS, 120 kN	1	12	D-DT-7021	0010259
6	COMPRESSION DEAD END CLAMP ASSEMBLY	1	12	D-DT-7000	0168745
7	MULTI-FREQUENCY VIBRATION DAMPER TO FIT CHICADEE ACSR	1	12	D-DT-7005	0168760
8	LINE POST INSULATOR ASSEMBLY - HORIZONTAL 66kV, 31mm/kV, 5.3 kN INSULATOR, WITH TRUNION CLAMP (INCLUDES ARMOUR ROD SET)	-	6	D-DT-7031	0180641

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

NOTES  
1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DO	CP	CP	2020-02-17

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
NAME	SHOW	DATE	TITLE	NAME	SIGN	DATE	
DO	KS	20/02/17					
DO	KS	20/02/17					
DO	CP	20/02/17					

Transnet Capital Projects  
 IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE :  
 66 kV BRANCH MASTS - 1 & 2 BLO / ISC 32/1  
 PHASE CONDUCTOR STRAIN CONFIGURATION

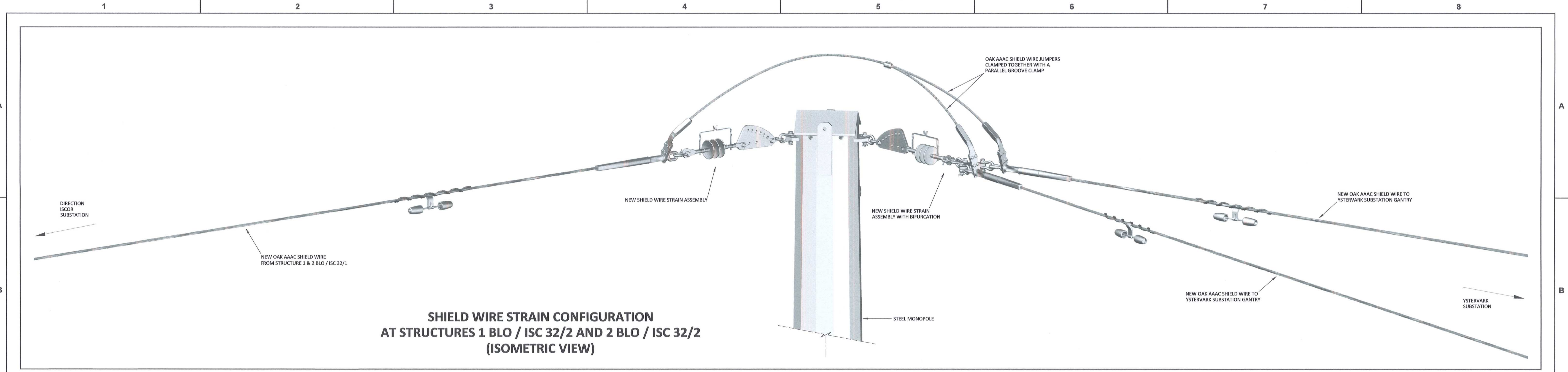
PROJECT NUMBER: 19247012-3  
 SHEET: 010  
 REV: 0



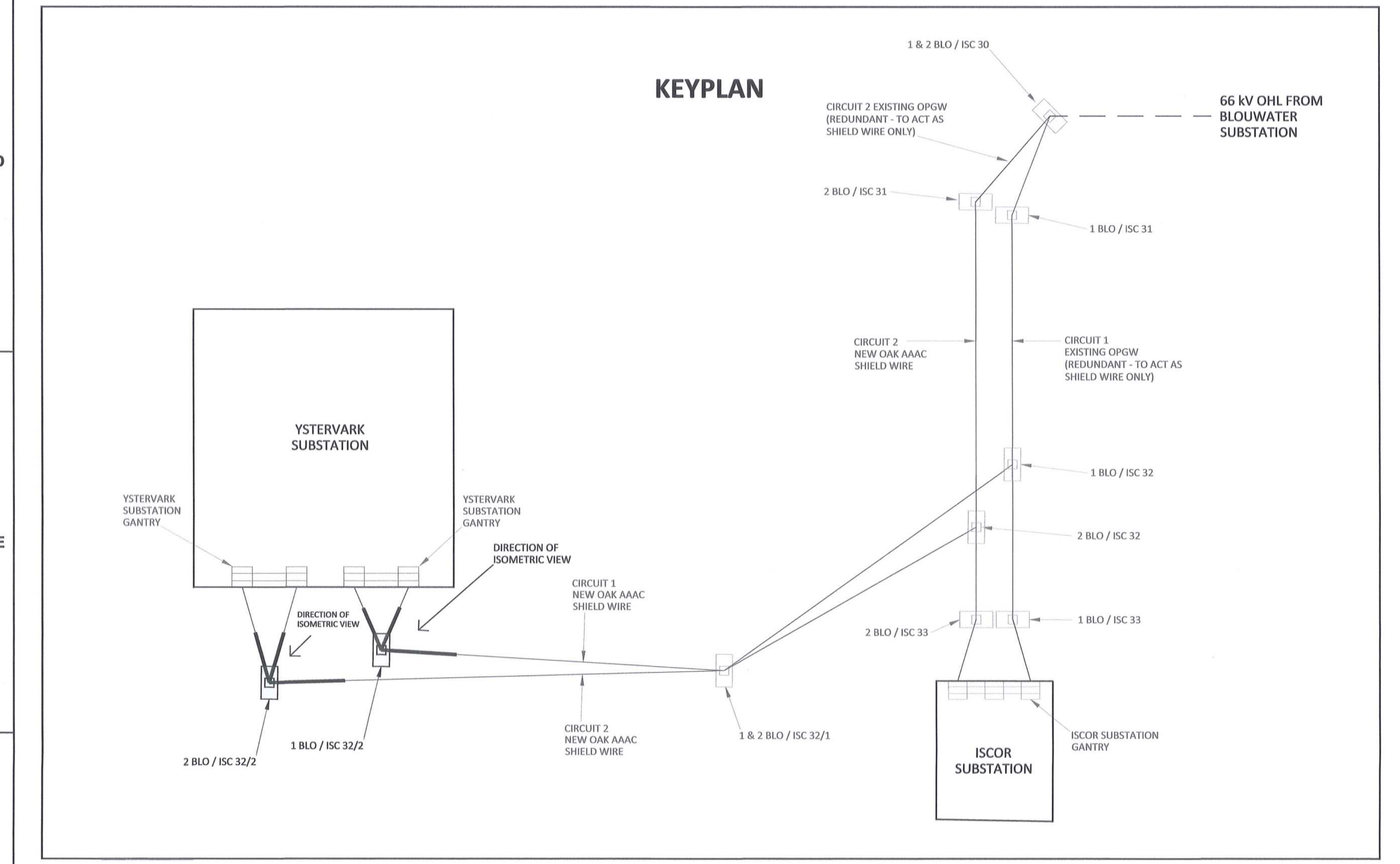
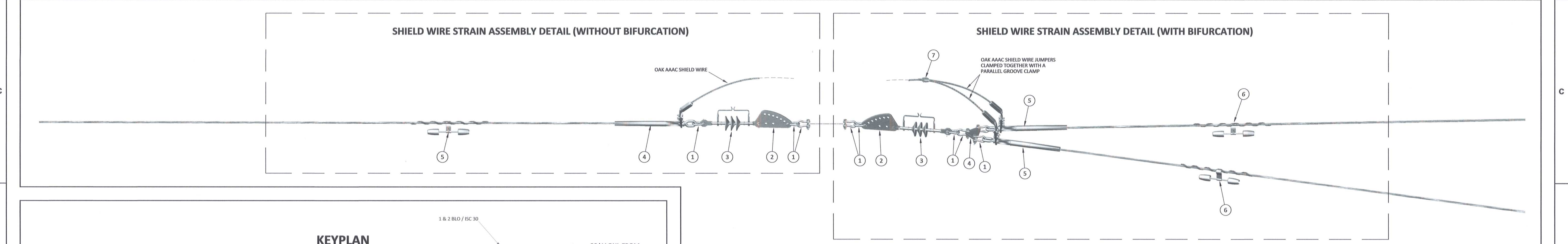
PORT OF SALDANHA

PROJECT NUMBER	DO	FBS	DSE	TYPE	DRAWING NO.	SHEET	REV	ID
19247012-3	01	00	00	00	010	01	00	00





**SHIELD WIRE STRAIN CONFIGURATION AT STRUCTURES 1 BLO / ISC 32/2 AND 2 BLO / ISC 32/2 (ISOMETRIC VIEW)**



**KEYPLAN**

ITEM	SHIELD WIRE STRAIN ASSEMBLY DESCRIPTION (WITHOUT BIFURCATION)	QTY (PER ASSEMBLY)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	3	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN (WITH ARCING HORNS - 8 mm SPARK GAP)	1	D-DT-7012	0167605
4	COMPRESSION DEAD END CLAMP ASSEMBLY	1	D-DT-7000	0402497
5	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OAK AAAC	1	D-DT-7005	0226767

ITEM	SHIELD WIRE STRAIN ASSEMBLY DESCRIPTION (WITH BIFURCATION)	QTY (PER ASSEMBLY)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	6	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN (WITH ARCING HORNS - 8 mm SPARK GAP)	1	D-DT-7012	0167605
4	YOKE PLATE - TRIANGLE, 120kN	1	D-DT-7015	0168861
5	COMPRESSION DEAD END CLAMP ASSEMBLY	2	D-DT-7000	0402497
6	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OAK AAAC	2	D-DT-7005	0226767
7	PARALLEL GROOVE CLAMP - ALUMINIUM (CONDUCTOR RANGE 6.6 - 18.9 mm)	1	BUY OUT - TO SUITE	-

MASTER  
19 FEB 2020  
ASCOM

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**  
1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NCC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

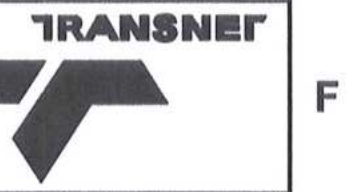
NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	CP	CP	2020-02-17

CONTRACTOR / CONSULTANT				TRANSHNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	AS	20/02/17				
CHECKED	KS		20/02/17				
DESIGNED	NM		20/02/17				
CHECKED	CP		20/02/17				

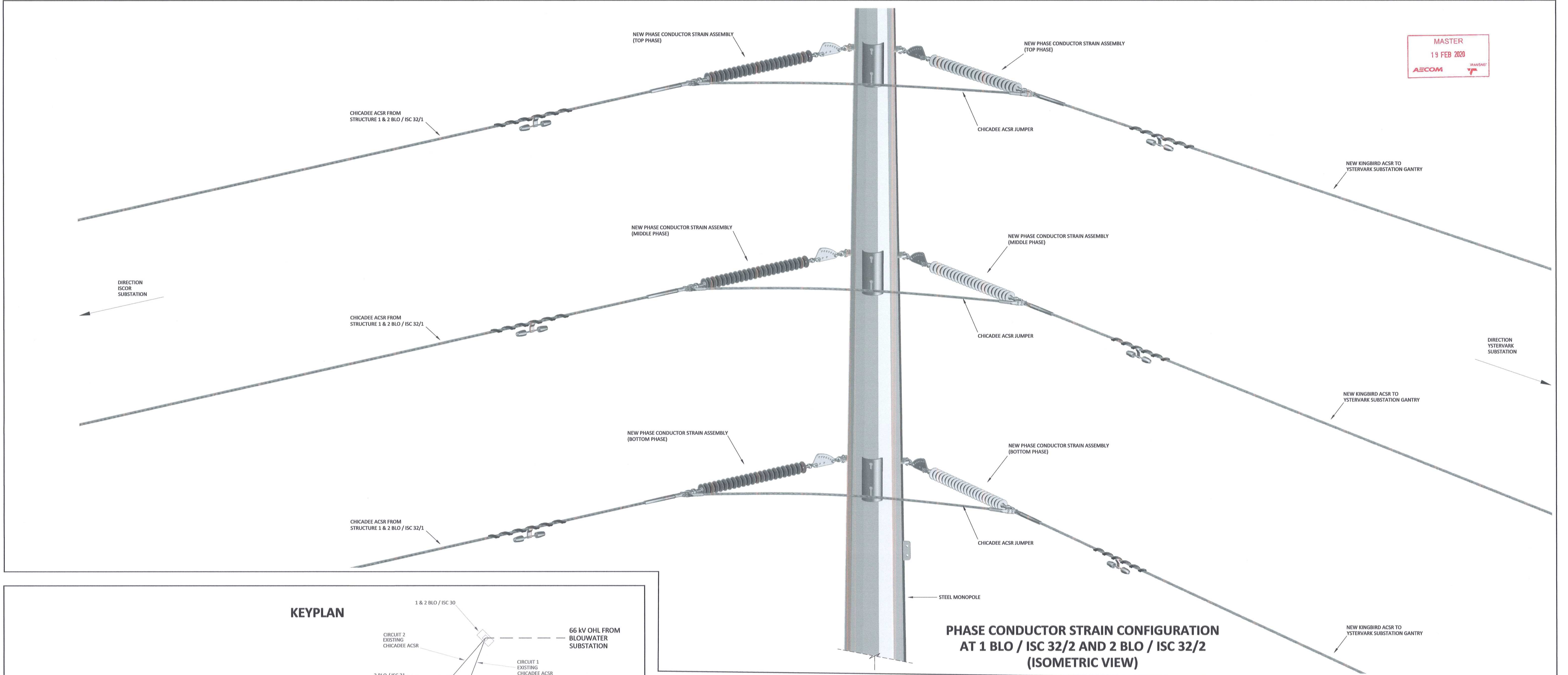
OPERATING DIVISIONS				PRELNG. / PR. TECH. / PR. ARCH			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE

Transnet Capital Projects  
IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE :  
66 kV BRANCH LINE MASTS -  
1 BLO / ISC 32/2 AND 2 BLO / ISC 32/2  
SHIELD WIRE STRAIN CONFIGURATION

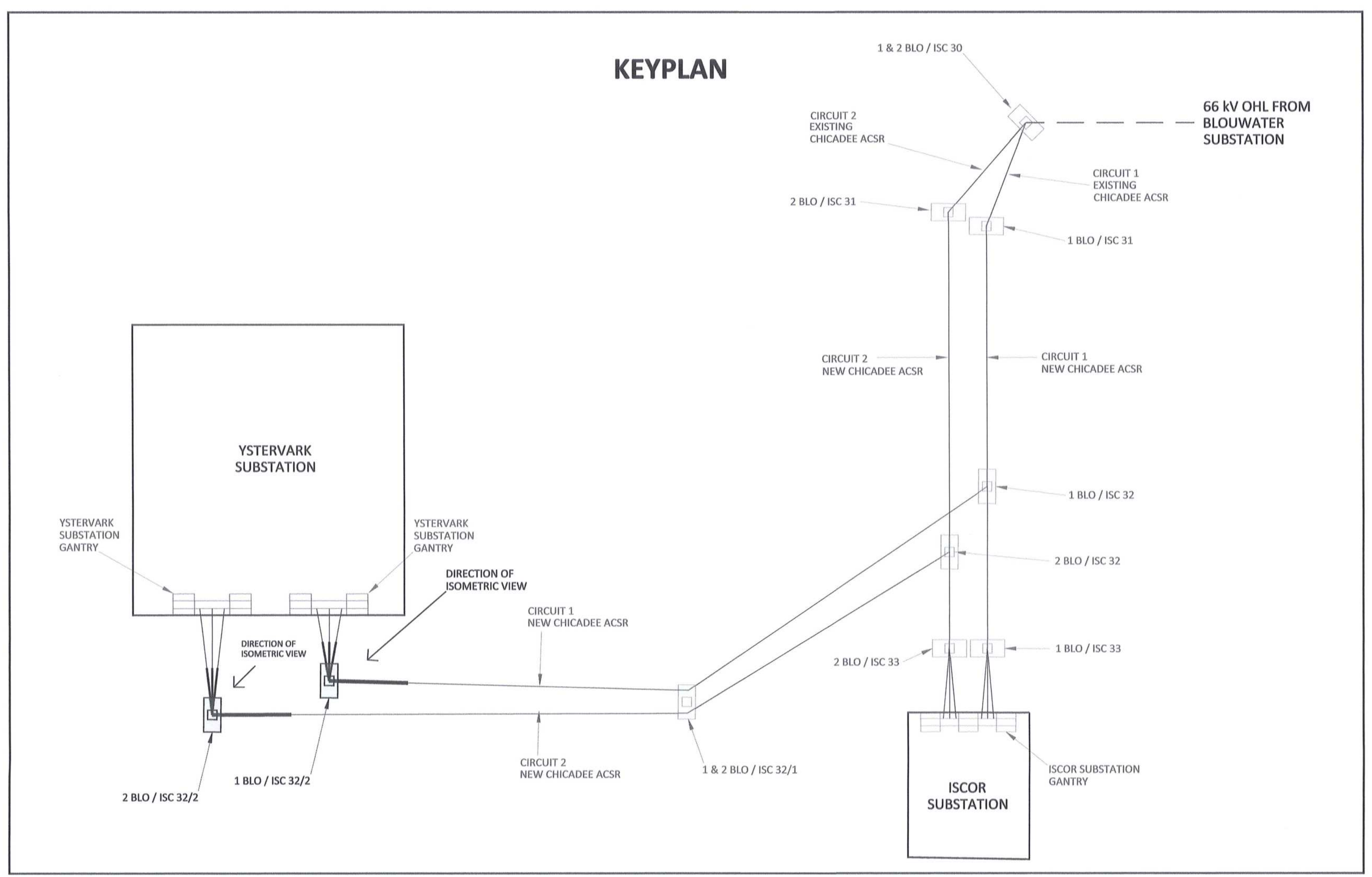
PROJECT NUMBER: 19247012-3000-DE-00750100AE  
SCALE: N.T.S.



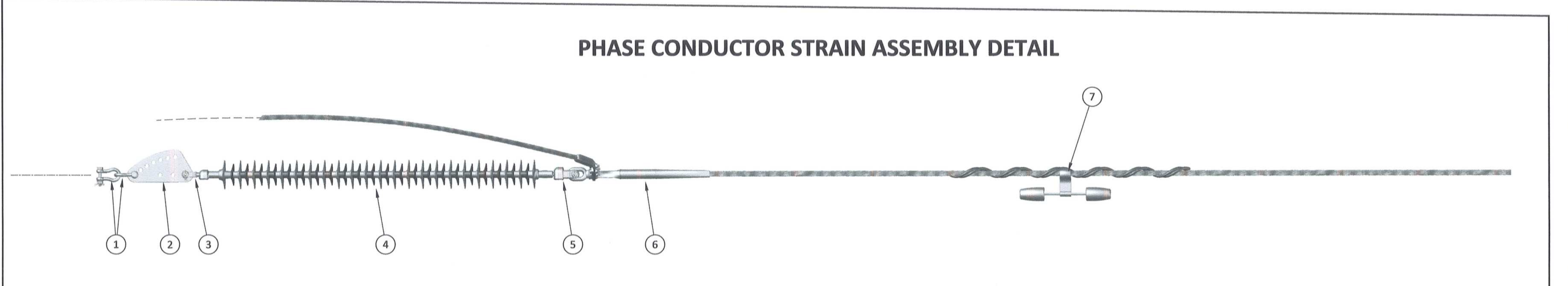
MASTER  
19 FEB 2020  
AECOM TRANSNET



**PHASE CONDUCTOR STRAIN CONFIGURATION AT 1 BLO / ISC 32/2 AND 2 BLO / ISC 32/2 (ISOMETRIC VIEW)**



**KEYPLAN**



**PHASE CONDUCTOR STRAIN ASSEMBLY DETAIL**

ITEM	PHASE CONDUCTOR STRAIN ASSEMBLY DESCRIPTION (FOR CHICADEE ACSR)	QTY (PER ASSEMBLY)	TOTAL QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	6	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	3	D-DT-7042	0175857
3	CLEVIS BALL, 120 kN	1	3	D-DT-6059	0222125
4	INSULATOR (LONG ROD), 66kV, 31mm/kV, 120 kN	1	3	D-DT-7029	0167609
5	SOCKET CLEVIS, 120 kN	1	3	D-DT-7021	0010259
6	COMPRESSION DEAD END CLAMP ASSEMBLY	1	3	D-DT-7000	0168745
7	MULTI-FREQUENCY VIBRATION DAMPER TO FIT CHICADEE ACSR	1	3	D-DT-7005	0168960

ITEM	PHASE CONDUCTOR STRAIN ASSEMBLY DESCRIPTION (FOR KINGBIRD ACSR)	QTY (PER ASSEMBLY)	TOTAL QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	6	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	3	D-DT-7042	0175857
3	CLEVIS BALL, 120 kN	1	3	D-DT-6059	0222125
4	INSULATOR (LONG ROD), 132kV, 31mm/kV, 120 kN	1	3	D-DT-7014	0167607
5	SOCKET CLEVIS, 120 kN	1	3	D-DT-7021	0010259
6	COMPRESSION DEAD END CLAMP ASSEMBLY	1	3	D-DT-7000	0168747
7	MULTI-FREQUENCY VIBRATION DAMPER TO FIT KINGBIRD ACSR	1	3	D-DT-7005	0168893

**NOTES**  
1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

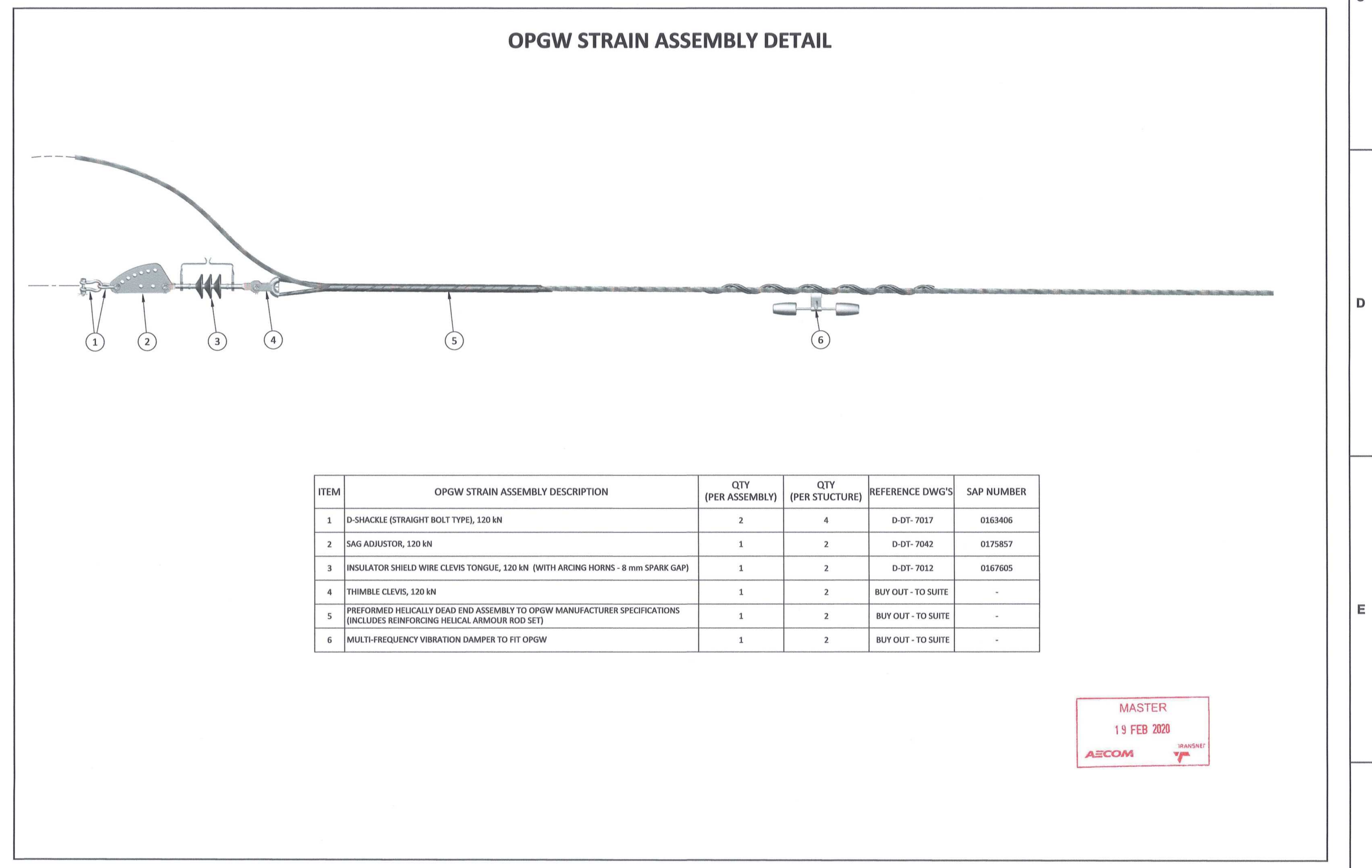
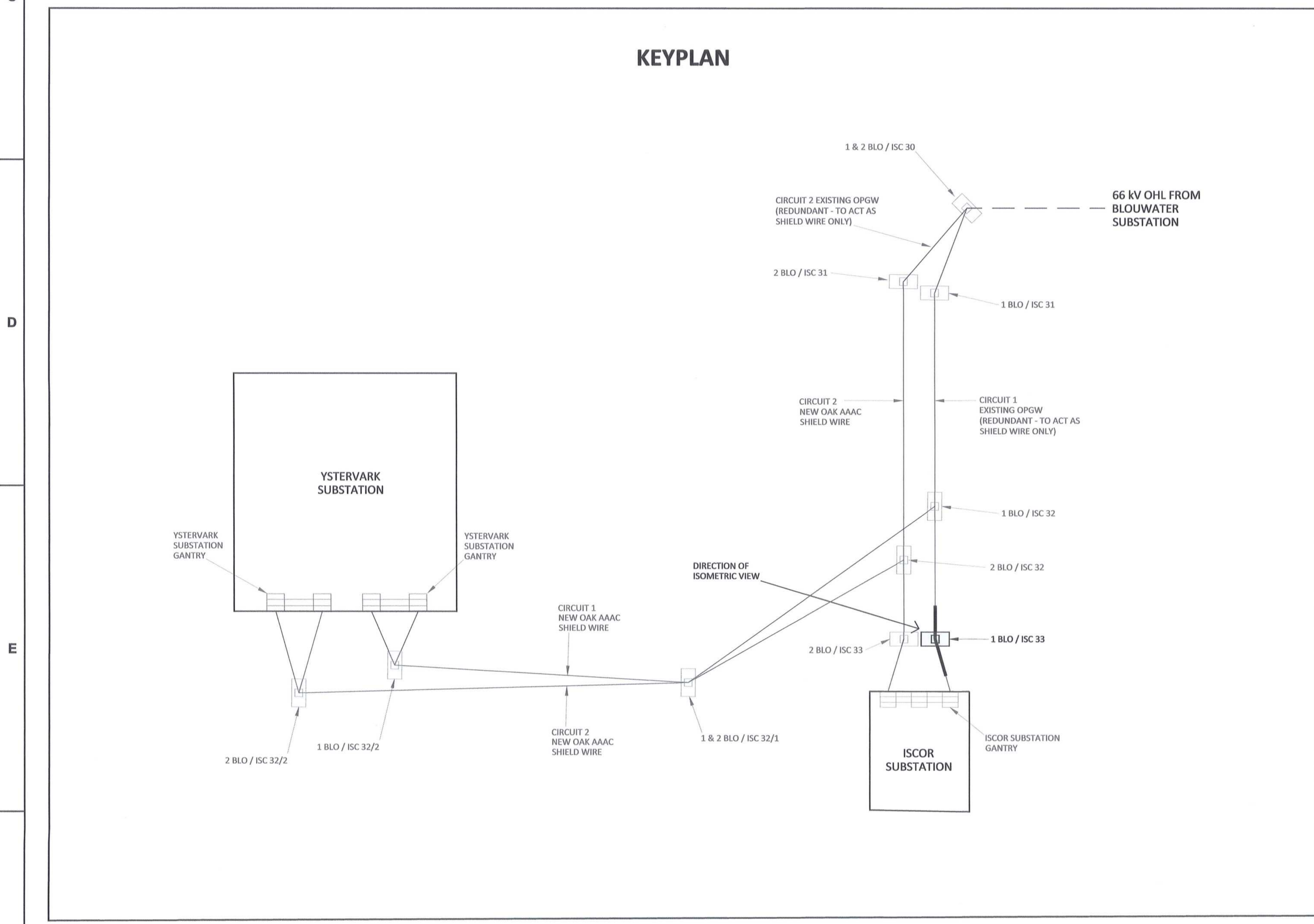
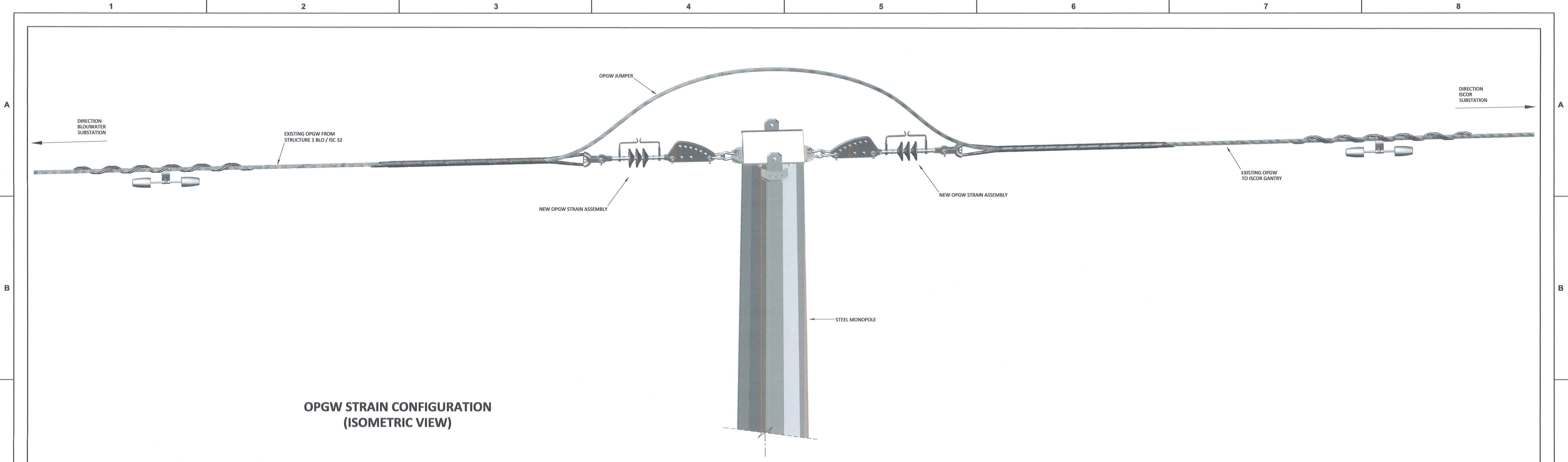
REVISIONS			
NO.	DESCRIPTION	BY	DATE
00	ISSUED FOR CONSTRUCTION	DD CP CP	2020-02-17

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE	TITLE
DD		20	02	DD		20	02
KS		20	02			20	02
NM		20	02			20	02
CP		20	02			20	02

Transnet Capital Projects  
**PORT OF SALDANHA**  
 IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE :  
 66 kV BRANCH LINE MASTS -  
 1 BLO / ISC 32/2 AND 2 BLO / ISC 32/2  
 PHASE CONDUCTOR STRAIN CONFIGURATION



PROJECT NUMBER	DD	FBS	DSE	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	3	0	E	DE	0076	01	00



MASTER  
19 FEB 2020  
AECOM

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NED SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	CP	CP	2020-02-17

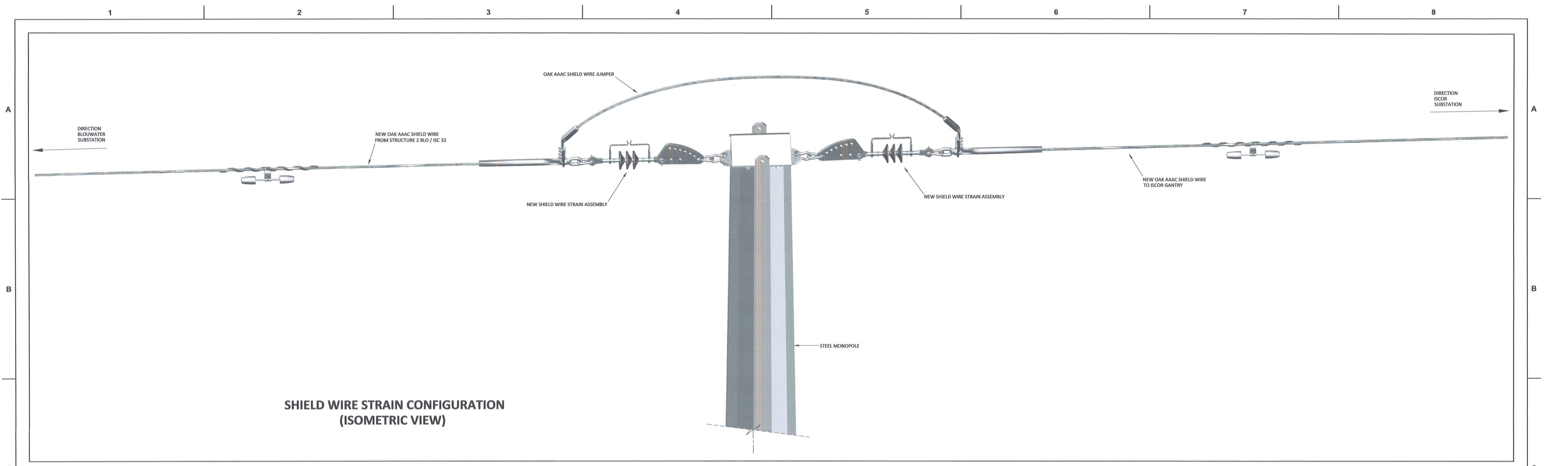
CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	AKA	20/02/17	PR. ENG. / PR. TECH. / PR. ARCH			
CHECKED	KS		20/02/17	SIGNATURE			DATE
DESIGNED	NM		20/02/17	REG. NUMBER	202270126		20/02/17
CHECKED	CP		20/02/17	SCALE	N.T.S.		

Transnet Capital Projects

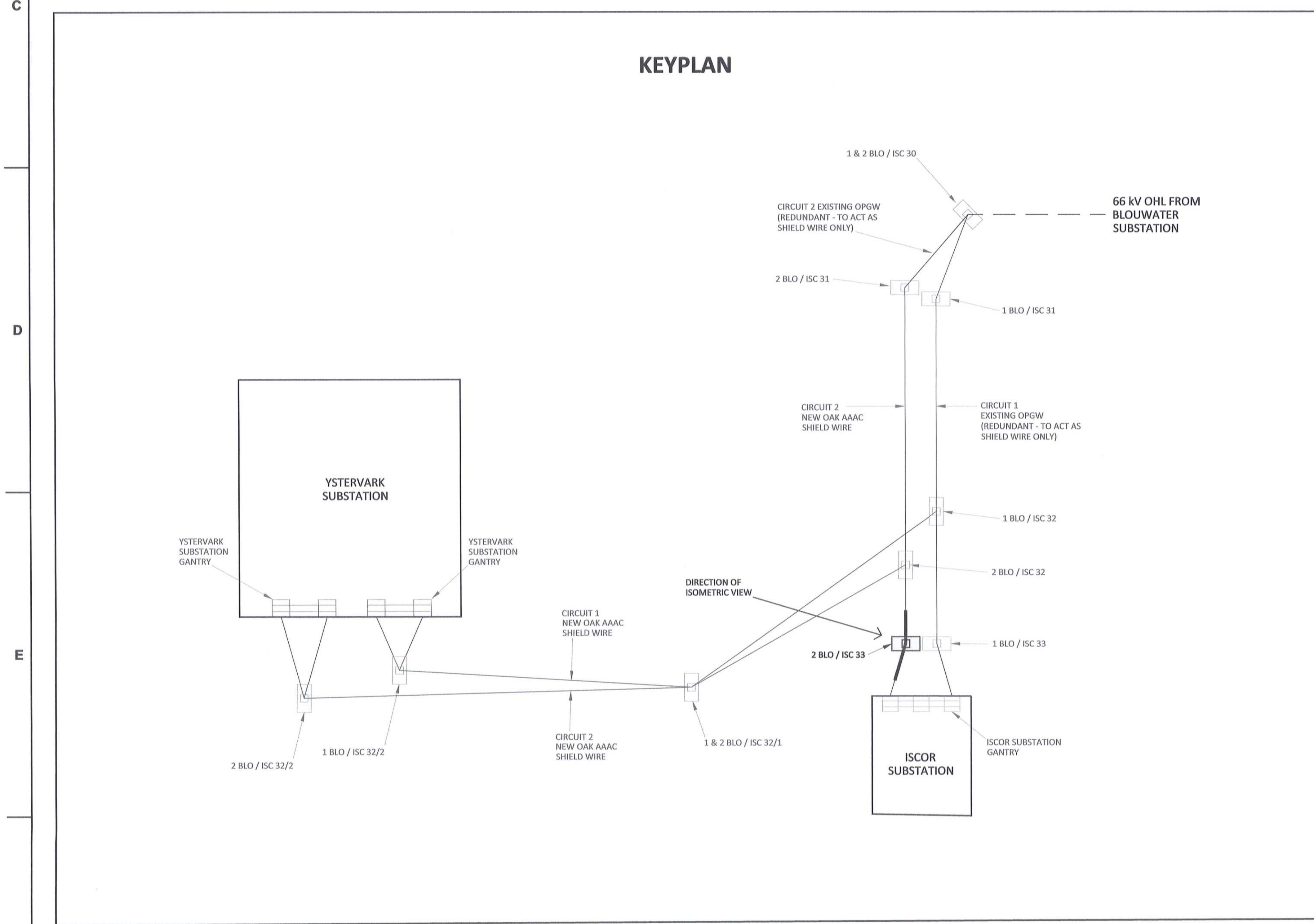
**PORT OF SALDANHA**

IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE :  
66 kV BRANCH LINE MASTS - 1 BLO / ISC 33  
OPGW STRAIN CONFIGURATION

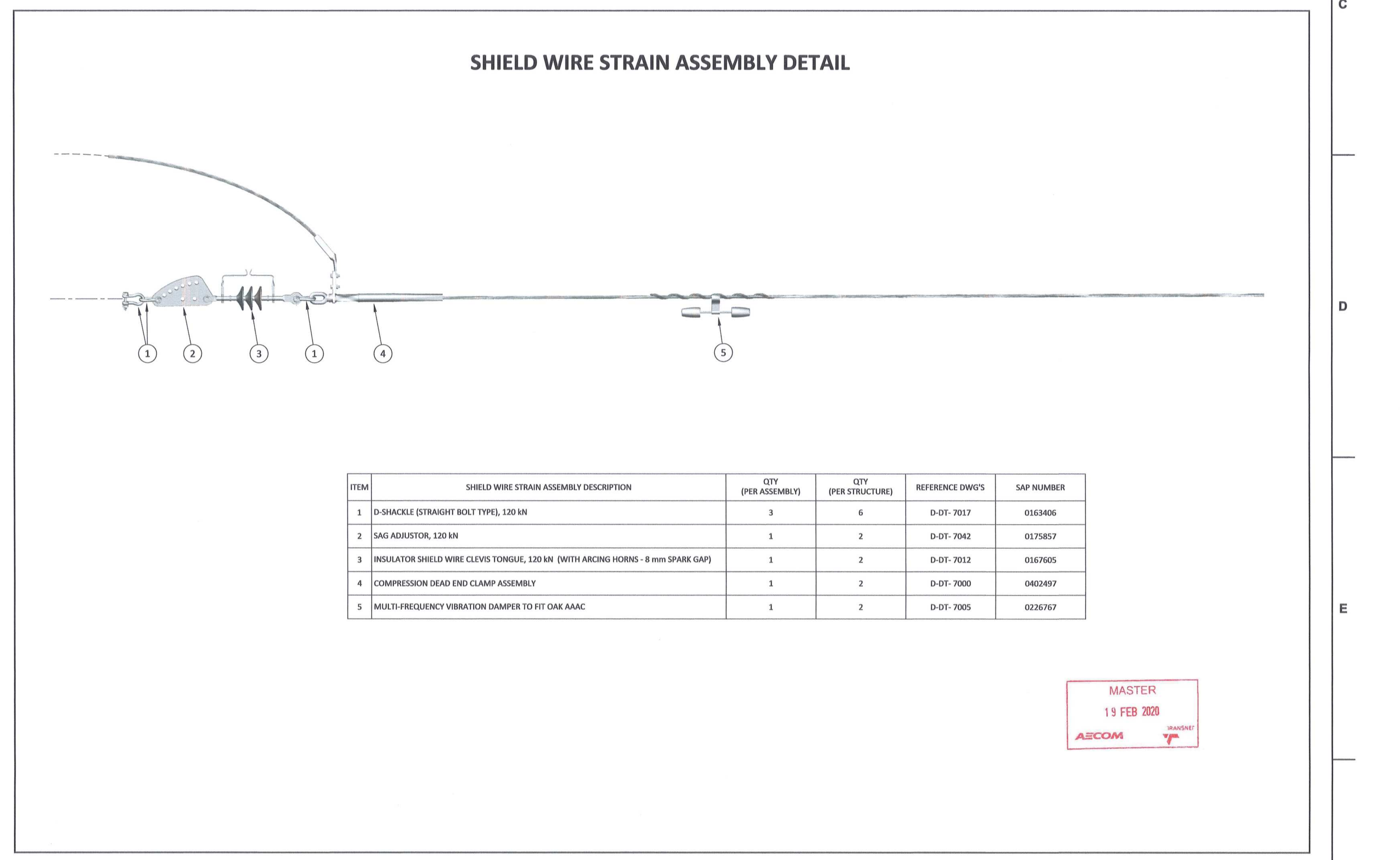
PROJECT NUMBER: 19247012-300-E-DE-0077-01-00-AE



**SHIELD WIRE STRAIN CONFIGURATION  
(ISOMETRIC VIEW)**



**KEYPLAN**



**SHIELD WIRE STRAIN ASSEMBLY DETAIL**

ITEM	SHIELD WIRE STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	3	6	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	2	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN (WITH ARCING HORNS - 8 mm SPARK GAP)	1	2	D-DT-7012	0167605
4	COMPRESSION DEAD END CLAMP ASSEMBLY	1	2	D-DT-7000	0402497
5	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OAK AAAC	1	2	D-DT-7005	0226767

MASTER  
19 FEB 2020  
ASCOM

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**  
1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

ISSUED FOR CONSTRUCTION				REVISIONS			
NO.	DESCRIPTION	BY	CHKD	APPD	DATE	NO.	DESCRIPTION
00	ISSUED FOR CONSTRUCTION	DD	CP	CP	2020-02-17		

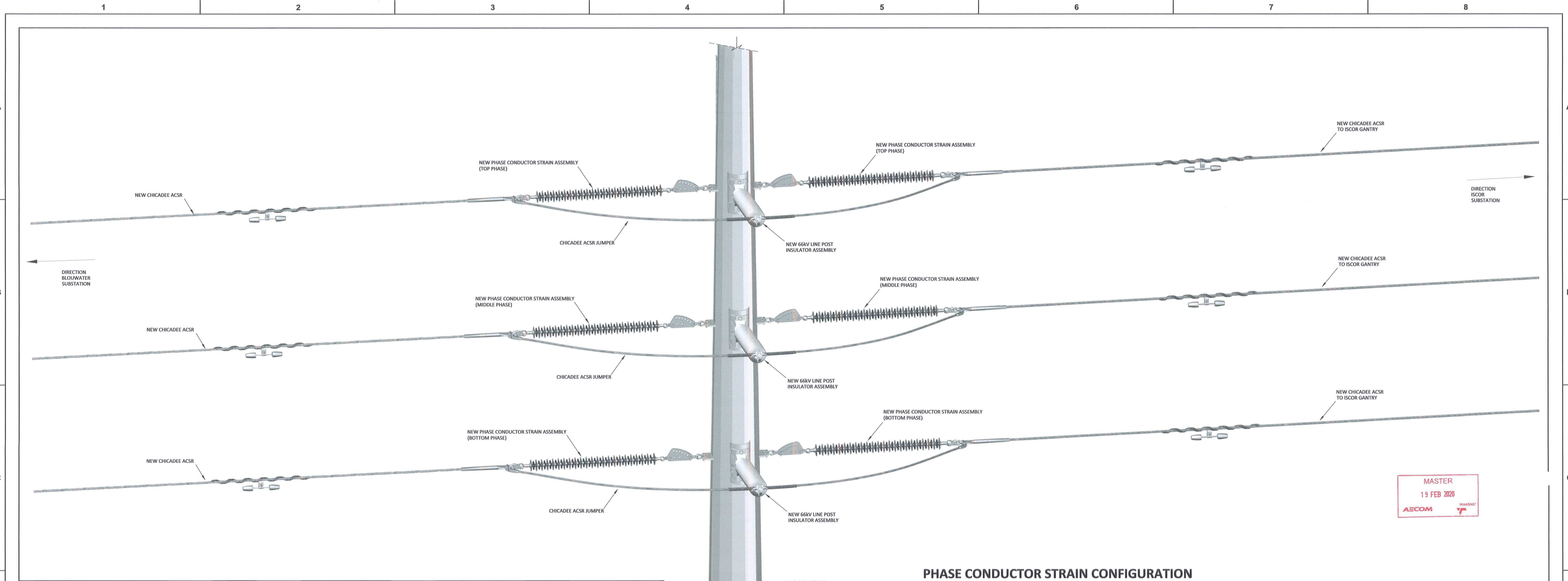
CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	KS		20/02/17	PR.ENG. / PR.TECH./PR. ARCH			
CHECKED	NM		20/02/17	NAME	C/PM		DATE
DESIGNED	CP		20/02/17	SIGNATURE			20/02/17
CHECKED				REG. NUMBER	20120126		
				SCALE	N.T.S.		

Transnet Capital Projects  
TABLE BAY BUILDING, TYERBERG PARK, 163 LYS KINGS DRIVE, PLATTEKLOOF, 8001  
TEL: 021 940 1999 FAX: 021 940 2455

**PORT OF SALDANHA**

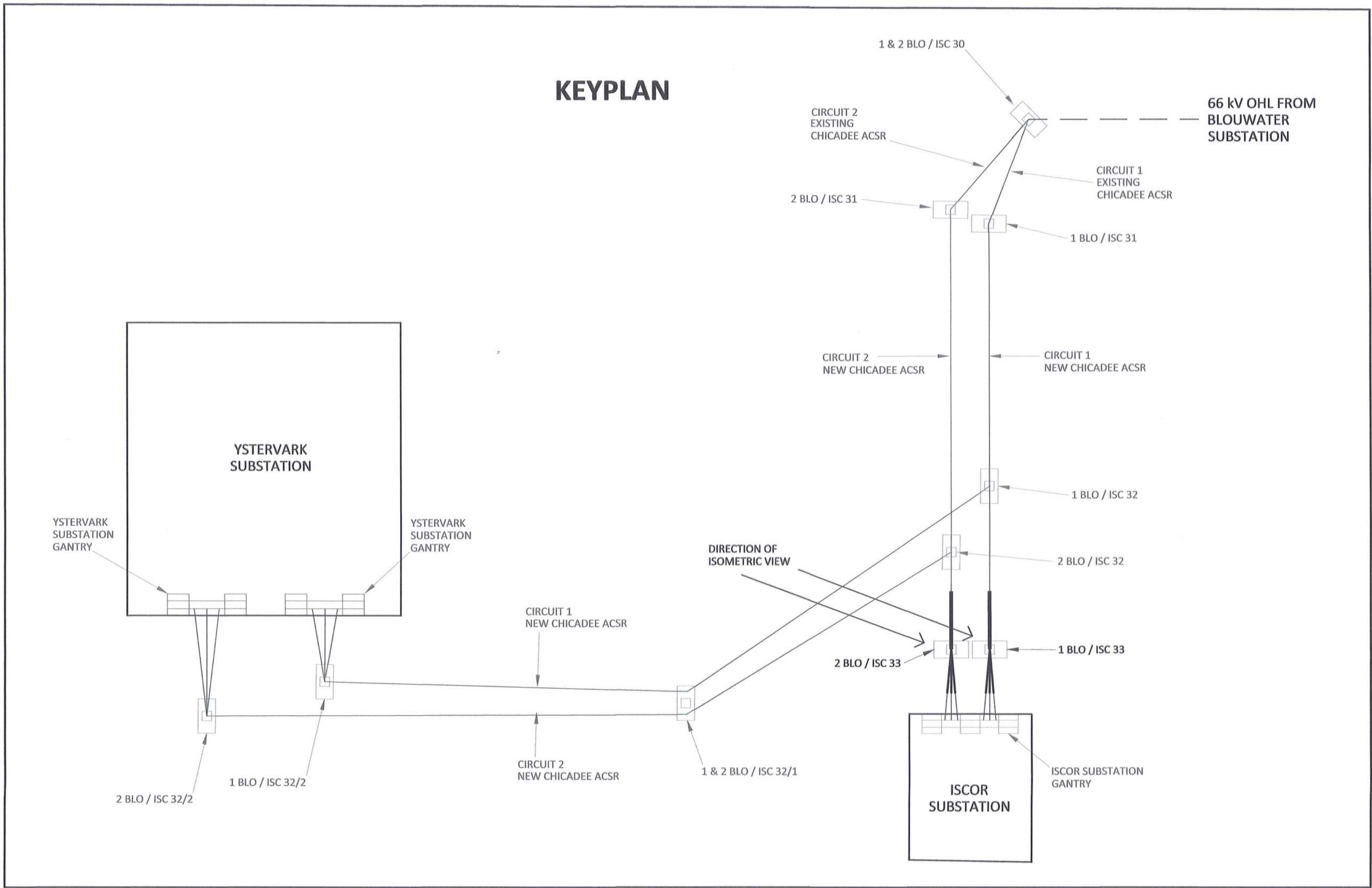
IRON ORE TIPLER 3 PROJECT  
BULK POWER UPGRADE :  
66 kV BRANCH LINE MASTS - 2 BLO / ISC 33  
SHIELD WIRE STRAIN CONFIGURATION

PROJECT NUMBER: A019247012300E DE00780100AE  
SHEET: 01 OF 01



**PHASE CONDUCTOR STRAIN CONFIGURATION AT 1 BLO / ISC 33 AND 2 BLO / ISC 33 (ISOMETRIC VIEW)**

MASTER  
19 FEB 2020  
ASCOM TRANSNET

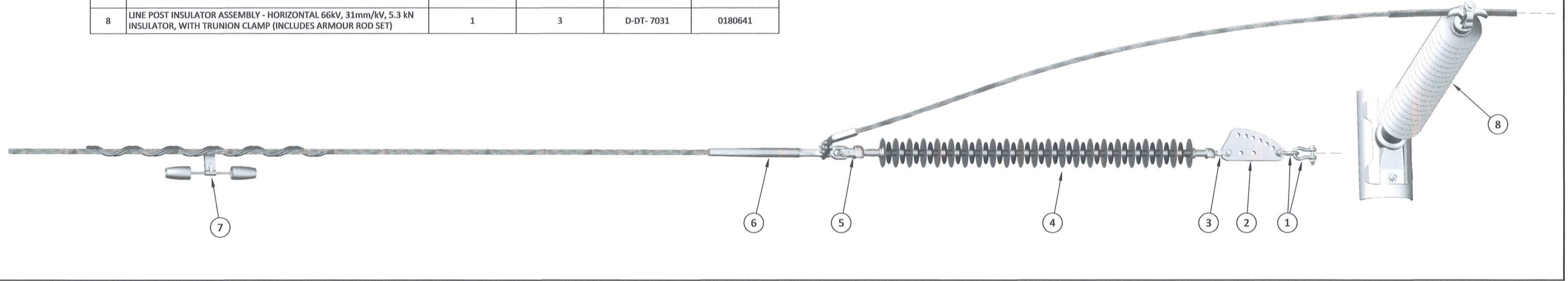
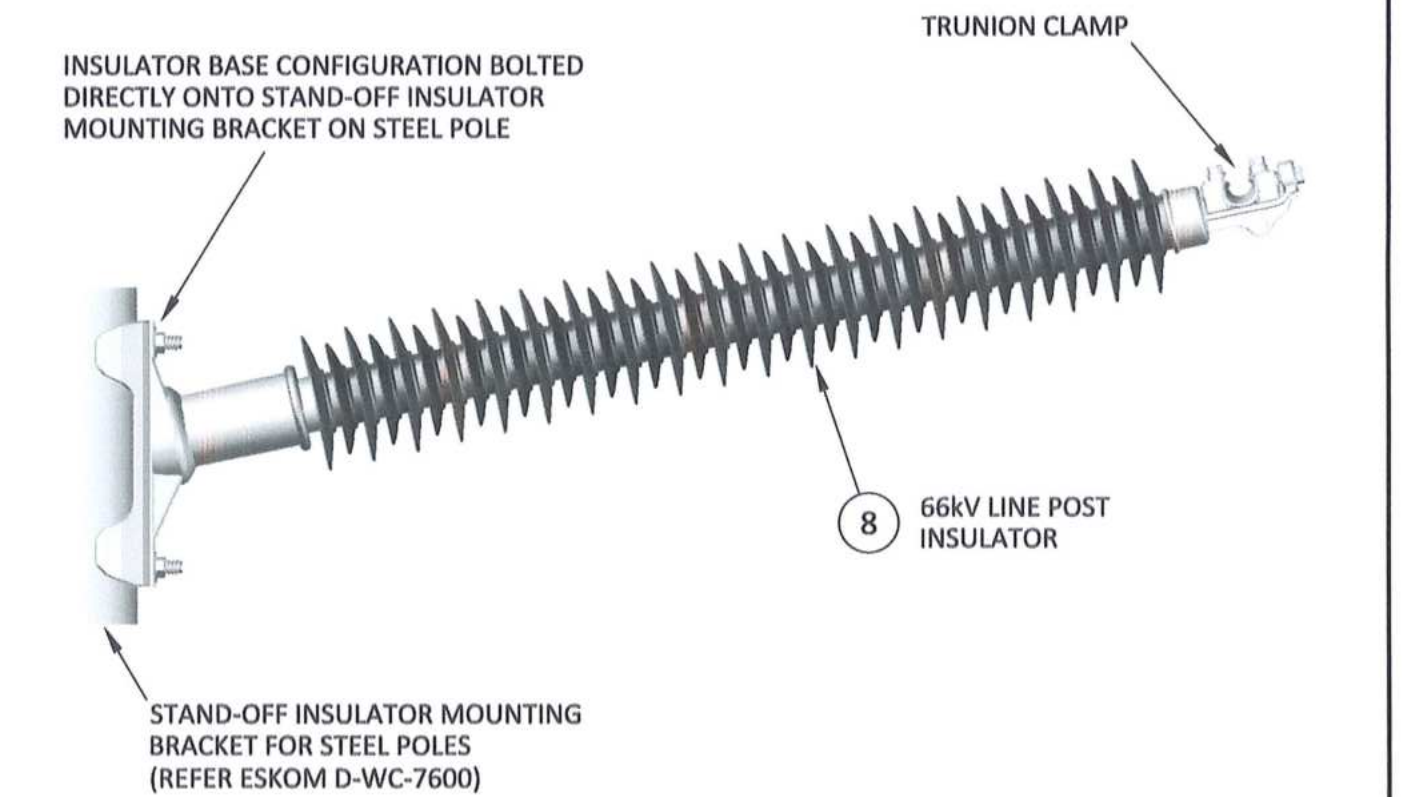


**KEYPLAN**

**PHASE CONDUCTOR STRAIN ASSEMBLY DETAIL**

ITEM	PHASE CONDUCTOR STRAIN ASSEMBLY DESCRIPTION	QTY (PER ASSEMBLY)	QTY (PER STRUCTURE)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	12	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	6	D-DT-7042	0175857
3	CLEVIS BALL, 120 kN	1	6	D-DT-6059	0222125
4	INSULATOR (LONG ROD), 66kV, 31mm/kV, 120 kN	1	6	D-DT-7029	0167609
5	SOCKET CLEVIS, 120 kN	1	6	D-DT-7021	0010259
6	COMPRESSION DEAD END CLAMP ASSEMBLY	1	6	D-DT-7000	0168745
7	MULTI-FREQUENCY VIBRATION DAMPER TO FIT CHICADEE ACSR	1	6	D-DT-7005	0168960
8	LINE POST INSULATOR ASSEMBLY - HORIZONTAL 66kV, 31mm/kV, 5.3 kN INSULATOR, WITH TRUNION CLAMP (INCLUDES ARMOUR ROD SET)	1	3	D-DT-7031	0180641

**66kV LINE POST INSULATOR ASSEMBLY DETAIL**



**NOTES**  
1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD		20 02 14				
CHECKED	KS		20 02 14				
DESIGNED	NM		20 02 14				
CHECKED	CP		20 02 14				
OPERATING DIVISIONS				PRELNG. / PR. TECH. / PR. ARCH			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
ISSUED FOR CONSTRUCTION	DD	CP	CP	2020-02-14			
NO.	DESCRIPTION	BY	CHKD	APPD.	DATE		
<b>REVISIONS</b>							
This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.							
REG. NUMBER 2012/0126				SCALE: N.T.S.			
PROJECT NUMBER 19247011				SHEET 01 OF 01			

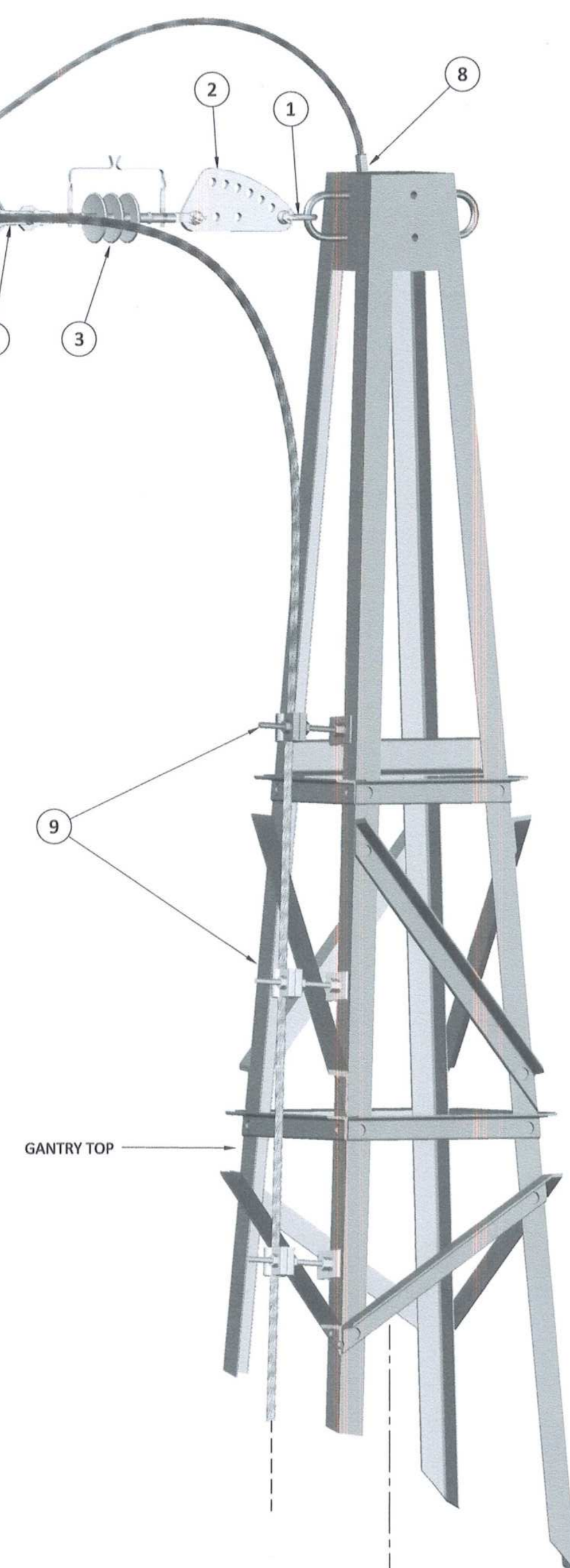
Transnet Capital Projects  
TRANSNET  
TABLE BAY BUILDING, TYGEBERG PARK,  
163 LITS BURG DRIVE, PLATTELOOF,  
8001  
TEL: 021 945 1990  
FAX: 021 945 2455

**PORT OF SALDANHA**  
IRON ORE TIPLER 3 PROJECT  
BULK POWER UPGRADE -  
66 kV BRANCH LINE MASTS -  
1 BLO / ISC 33 AND 2 BLO / ISC 33  
PHASE CONDUCTOR STRAIN CONFIGURATION

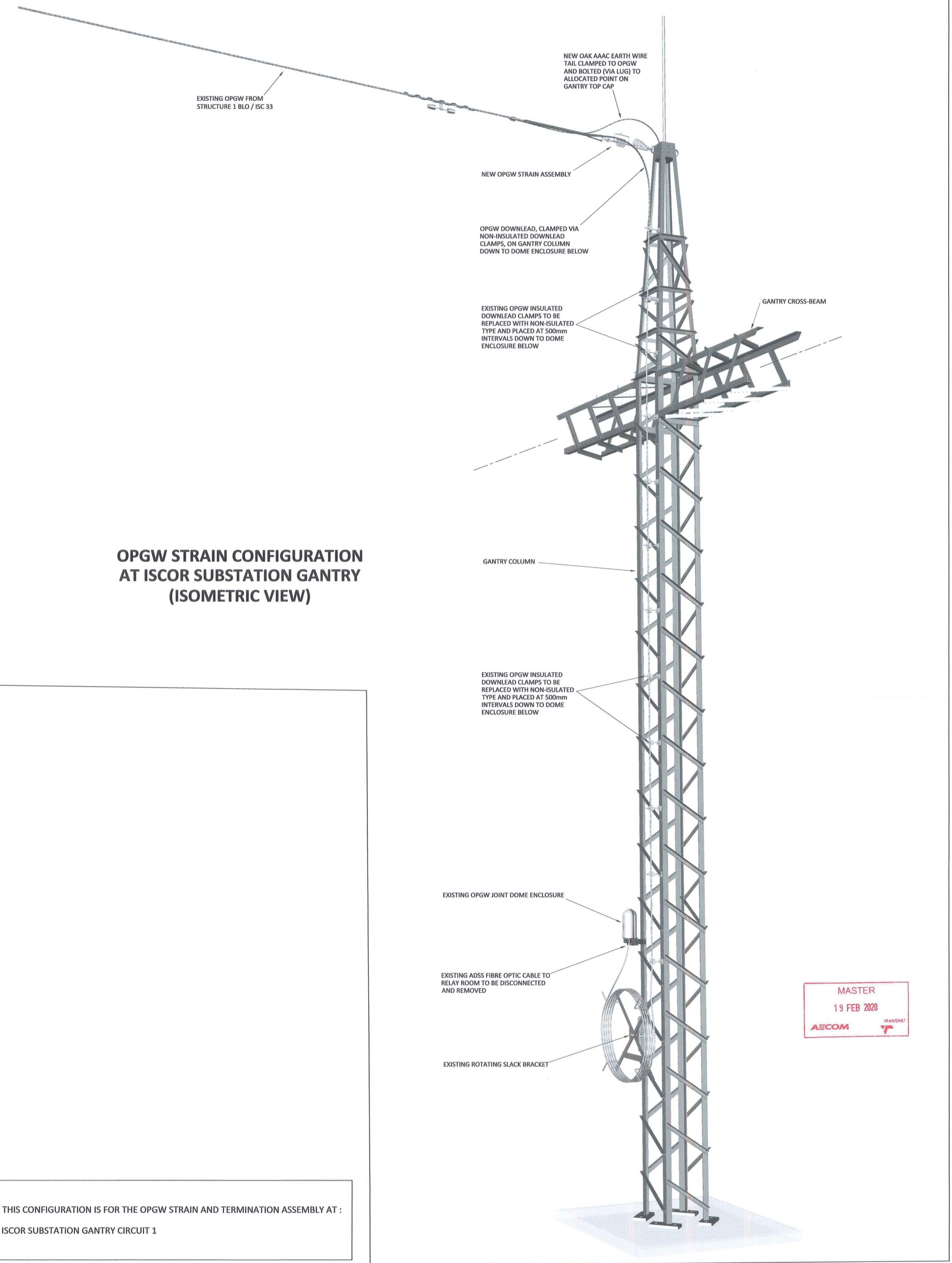
PROJECT NUMBER	DD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
19247011	2	3	0	E	DE	01	01	01

### OPGW STRAIN ASSEMBLY DETAIL

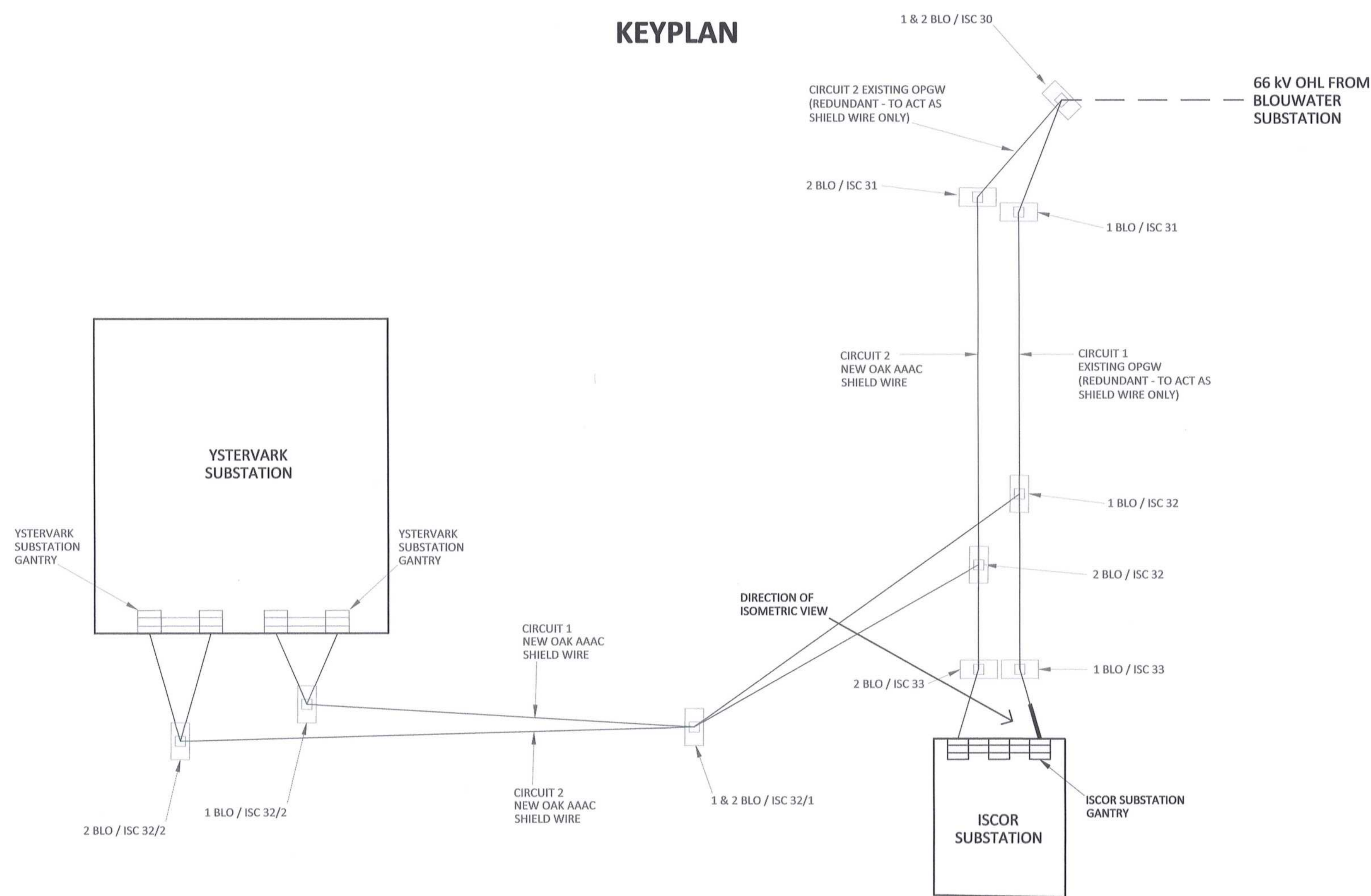
ITEM	OPGW STRAIN ASSEMBLY DESCRIPTION	QTY	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	1	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	D-DT-7042	0175857
3	INSULATOR SHIELD WIRE CLEVIS TONGUE, 120 kN (WITH ARCING HORNS - 8 mm SPARK GAP)	1	D-DT-7012	0167605
4	THIMBLE CLEVIS, 120 kN	1	BUY OUT - TO SUITE	-
5	PERFORMED HELICALLY DEAD END ASSEMBLY TO OPGW MANUFACTURER SPECIFICATIONS (INCLUDES REINFORCING HELICAL ARMOUR ROD SET)	1	BUY OUT - TO SUITE	-
6	PARALLEL GROOVE CLAMP - ALUMINIUM (CONDUCTOR RANGE 6.6 - 18.9 mm)	1	BUY OUT - TO SUITE	-
7	MULTI-FREQUENCY VIBRATION DAMPER TO FIT OPGW	1	BUY OUT - TO SUITE	-
8	LUG, ALUMINIUM INDENT CRIMP	1	D-DT-3074	0222095
9	NON-INSULATED DOWNLEAD CLAMPS FOR OPGW, SECURELY FIXED TO GANTRY COLUMN AT 500mm INTERVALS DOWN TO DOME ENCLOSURE	TO SUITE	BUY OUT - TO SUITE	-



### OPGW STRAIN CONFIGURATION AT ISCOR SUBSTATION GANTRY (ISOMETRIC VIEW)



### KEYPLAN



THIS CONFIGURATION IS FOR THE OPGW STRAIN AND TERMINATION ASSEMBLY AT :  
ISCOR SUBSTATION GANTRY CIRCUIT 1

**NOTES**  
1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.  
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

CONTRACTOR / CONSULTANT				TRANSET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	[Signature]	20 02 17				
CHECKED	KS	[Signature]	20 02 17				
DESIGNED	NM	[Signature]	20 02 17				
CHECKED	CP	[Signature]	20 02 17				

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE
PRE-ENG. / PR. TECH. / PR. ARCH			
C / P / M			
SIGNATURE			20 02 17
REG. NUMBER	2012270128		

REVISIONS									
NO.	DESCRIPTION	BY	CHKD	APPD	DATE				
00	ISSUED FOR CONSTRUCTION	DD	CP	CP	2020-02-17				

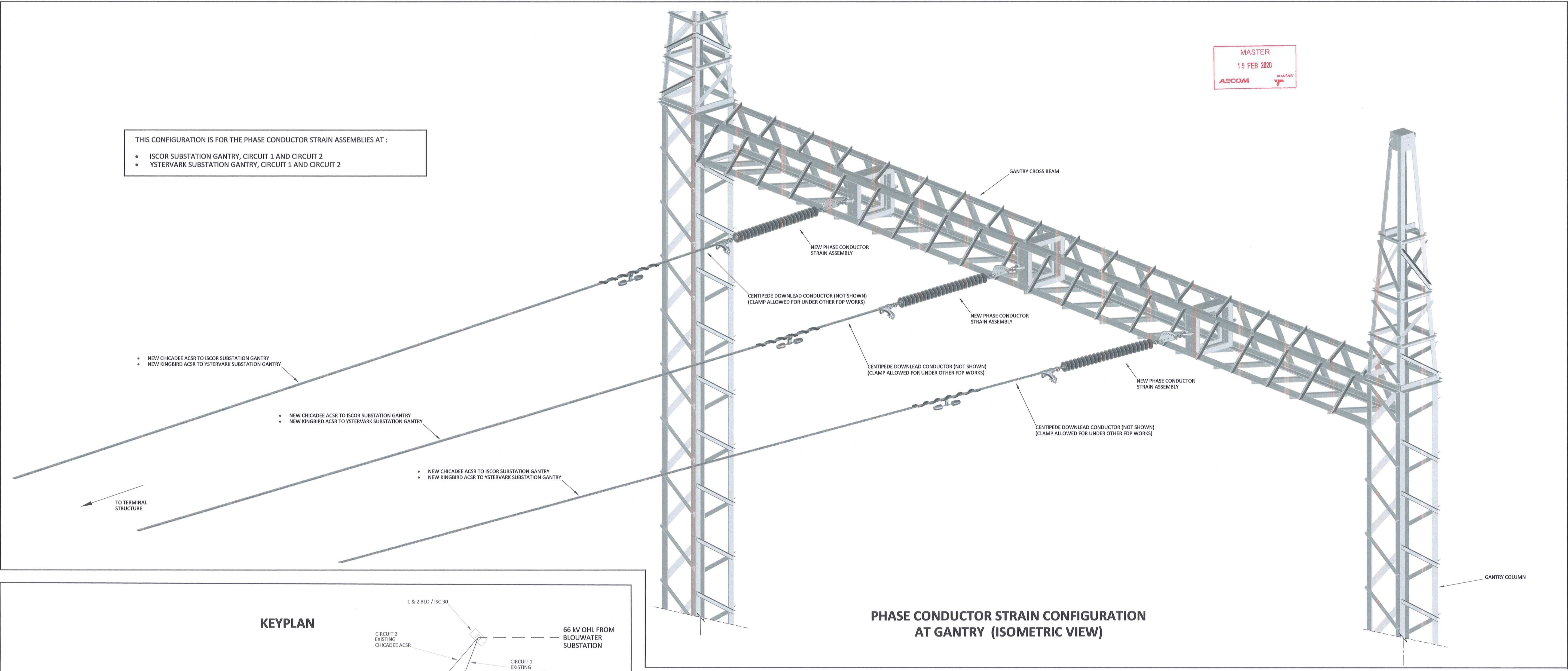
  

PORT OF SALDANHA									
IRON ORE TIPPLER 3 PROJECT									
BULK POWER UPGRADE :									
66 KV BRANCH LINE MASTS - SUBSTATION GANTRY									
OPGW STRAIN AND TERMINATION CONFIGURATION									
PROJECT NUMBER	ISS	FBS	DHS	TYPE	DRAWING NO.	SHEET	REV	ID	
1924701	1	2	3	0	E	0	1	0	0

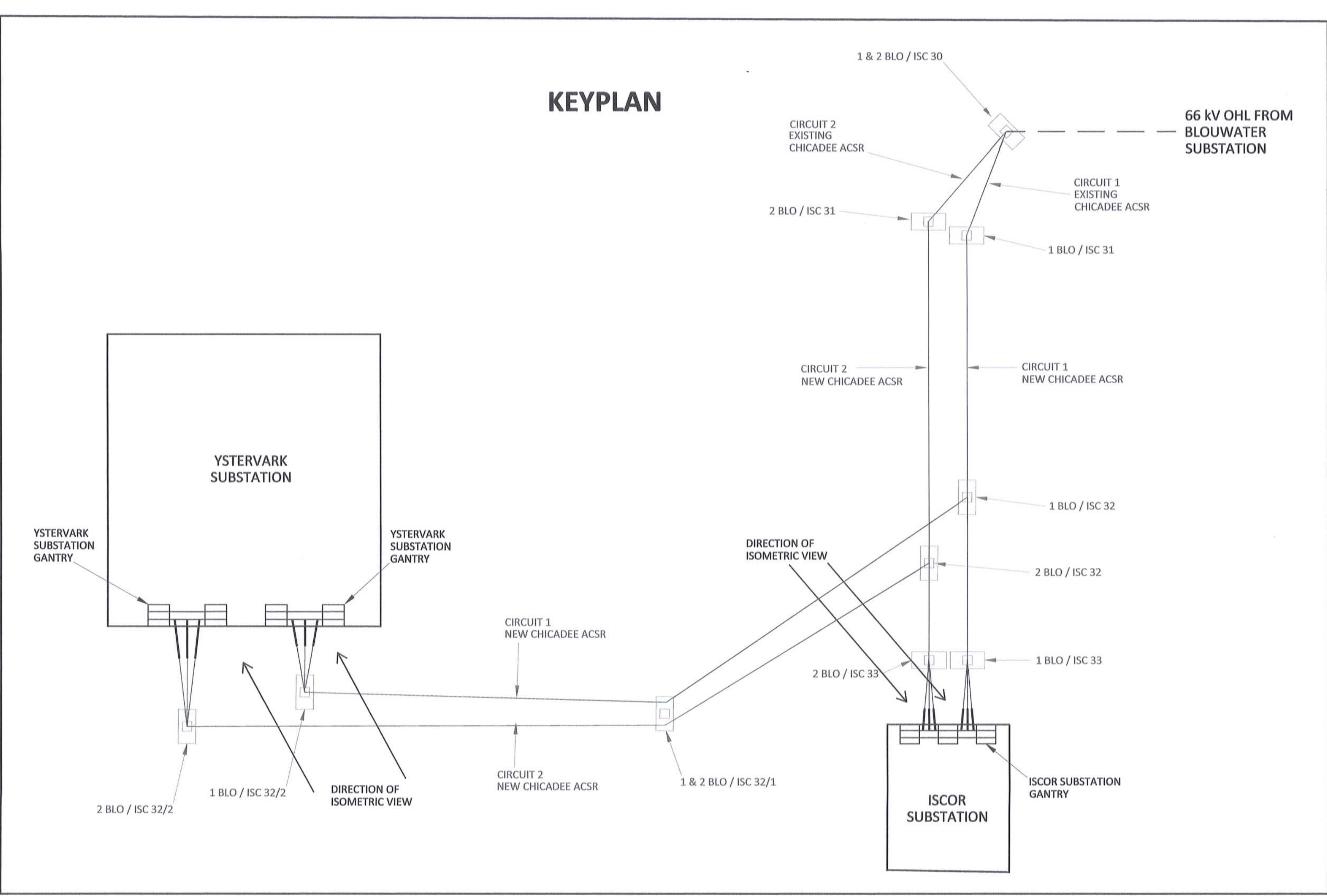
MASTER  
19 FEB 2020  
AECOM TRANSNET

THIS CONFIGURATION IS FOR THE PHASE CONDUCTOR STRAIN ASSEMBLIES AT :

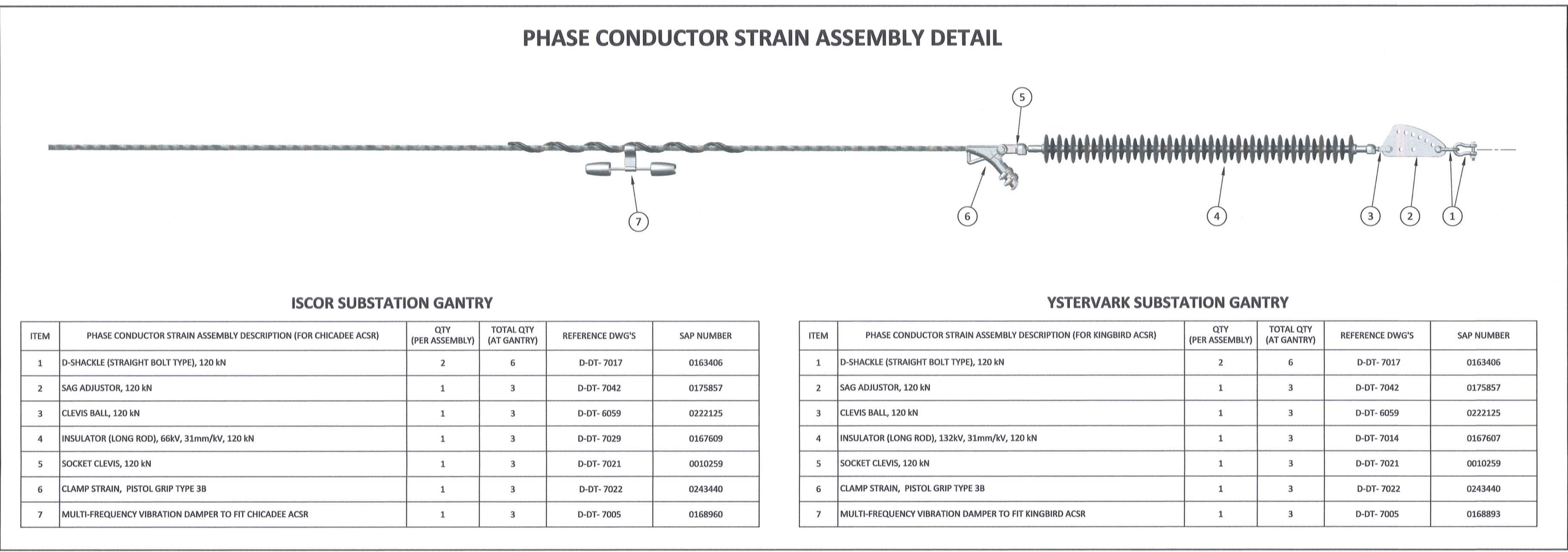
- ISCOR SUBSTATION GANTRY, CIRCUIT 1 AND CIRCUIT 2
- YSTERVARK SUBSTATION GANTRY, CIRCUIT 1 AND CIRCUIT 2



PHASE CONDUCTOR STRAIN CONFIGURATION AT GANTRY (ISOMETRIC VIEW)



KEYPLAN



PHASE CONDUCTOR STRAIN ASSEMBLY DETAIL

**ISCOR SUBSTATION GANTRY**

ITEM	PHASE CONDUCTOR STRAIN ASSEMBLY DESCRIPTION (FOR CHICADEE ACSR)	QTY (PER ASSEMBLY)	TOTAL QTY (AT GANTRY)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	6	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	3	D-DT-7042	0175857
3	CLEVIS BALL, 120 kN	1	3	D-DT-6059	0222125
4	INSULATOR (LONG ROD), 66kV, 31mm/kV, 120 kN	1	3	D-DT-7029	0167609
5	SOCKET CLEVIS, 120 kN	1	3	D-DT-7021	0010259
6	CLAMP STRAIN, PISTOL GRIP TYPE 3B	1	3	D-DT-7022	0243440
7	MULTI-FREQUENCY VIBRATION DAMPER TO FIT CHICADEE ACSR	1	3	D-DT-7005	0168960

**YSTERVARK SUBSTATION GANTRY**

ITEM	PHASE CONDUCTOR STRAIN ASSEMBLY DESCRIPTION (FOR KINGBIRD ACSR)	QTY (PER ASSEMBLY)	TOTAL QTY (AT GANTRY)	REFERENCE DWG'S	SAP NUMBER
1	D-SHACKLE (STRAIGHT BOLT TYPE), 120 kN	2	6	D-DT-7017	0163406
2	SAG ADJUSTOR, 120 kN	1	3	D-DT-7042	0175857
3	CLEVIS BALL, 120 kN	1	3	D-DT-6059	0222125
4	INSULATOR (LONG ROD), 132kV, 31mm/kV, 120 kN	1	3	D-DT-7014	0167607
5	SOCKET CLEVIS, 120 kN	1	3	D-DT-7021	0010259
6	CLAMP STRAIN, PISTOL GRIP TYPE 3B	1	3	D-DT-7022	0243440
7	MULTI-FREQUENCY VIBRATION DAMPER TO FIT KINGBIRD ACSR	1	3	D-DT-7005	0168893

**NOTES**

1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

DRAWING NO.	REFERENCE
1	

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	CP	CP	2020-02-17

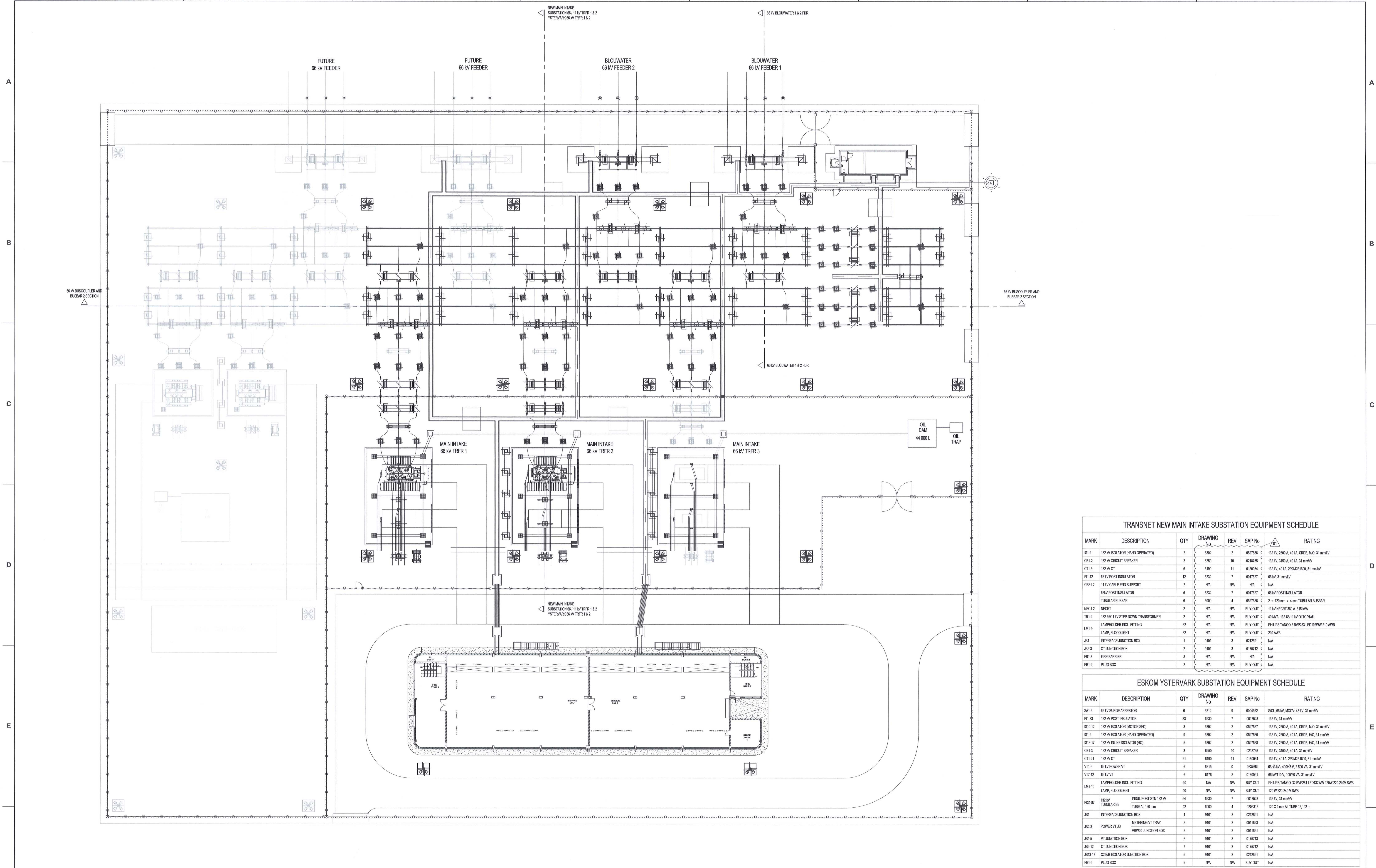
CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	DD	[Signature]	20 02 17	DESIGNED	NM	[Signature]	20 02 17
CHECKED	KS	[Signature]	20 02 17	CHECKED	CP	[Signature]	20 02 17

Transnet Capital Projects  
TRANSNET

**PORT OF SALDANHA**

IRON ORE TIPLER 3 PROJECT  
BULK POWER UPGRADE :  
66 kV BRANCH LINE MASTS - SUBSTATION GANTRY  
PHASE CONDUCTOR STRAIN CONFIGURATION (TYPICAL)

PROJECT NUMBER: 000 FBS DMS TYPE: DRAWING NO: 0820100 AE  
SCALE: N.T.S.



TRANSNET NEW MAIN INTAKE SUBSTATION EQUIPMENT SCHEDULE						
MARK	DESCRIPTION	QTY	DRAWING No.	REV	SAP No	RATING
IS1-2	132 kV ISOLATOR (HAND OPERATED)	2	6302	2	0527586	132 kV, 2500 A, 40 kVA, CRGB, MO, 31 mmkV
CB1-2	132 kV CIRCUIT BREAKER	2	6250	10	0218735	132 kV, 3150 A, 40 kVA, 31 mmkV
CT1-8	132 kV CT	6	6190	11	0180034	132 kV, 40 kVA, 272M2B1600, 31 mmkV
PI1-12	66 kV POST INSULATOR	12	6232	7	0017527	66 kV, 31 mmkV
CS1-12	11 kV CABLE END SUPPORT	2	N/A	N/A	N/A	N/A
	66 kV POST INSULATOR	6	6232	7	0017527	66 kV POST INSULATOR
	TUBULAR BUSBAR	6	6000	4	0527586	2 m 120 mm x 4 mm TUBULAR BUSBAR
NEC1-2	NECRT	2	N/A	N/A	BUY-OUT	11 kV NECRT 360 A, 315 kVA
TR1-2	132/66/11 kV STEP-DOWN TRANSFORMER	2	N/A	N/A	BUY-OUT	40 MVA 132/66/11 kV OLTC 17M1
LM1-9	LAMP HOLDER INCL. FITTING	32	N/A	N/A	BUY-OUT	PHILIPS TANGO 2 BVP283 LED 180W 210 AWB
	LAMP, FLOODLIGHT	32	N/A	N/A	BUY-OUT	210 AWB
JB1	INTERFACE JUNCTION BOX	1	9101	3	0212591	N/A
JB2-3	CT JUNCTION BOX	2	9101	3	0175712	N/A
FB1-8	FIRE BARRIER	8	N/A	N/A	N/A	N/A
FB1-2	PLUG BOX	2	N/A	N/A	BUY-OUT	N/A

ESKOM YSTERVARK SUBSTATION EQUIPMENT SCHEDULE						
MARK	DESCRIPTION	QTY	DRAWING No.	REV	SAP No	RATING
SA1-6	66 kV SURGE ARRESTOR	6	6212	8	0006562	SCCL 66 kV, MO, 40 kVA, 31 mmkV
PI1-33	132 kV POST INSULATOR	33	6230	7	0017528	132 kV, 31 mmkV
IS10-12	132 kV ISOLATOR (MOTORISED)	3	6302	2	0527587	132 kV, 2500 A, 40 kVA, CRGB, MO, 31 mmkV
IS1-8	132 kV ISOLATOR (HAND OPERATED)	9	6302	2	0527586	132 kV, 2500 A, 40 kVA, CRGB, HO, 31 mmkV
IS15-17	132 kV INLINE ISOLATOR (HO)	5	6302	2	0527586	132 kV, 2500 A, 40 kVA, CRGB, HO, 31 mmkV
CB1-3	132 kV CIRCUIT BREAKER	3	6250	10	0218735	132 kV, 3150 A, 40 kVA, 31 mmkV
CT1-21	132 kV CT	21	6190	11	0180034	132 kV, 40 kVA, 272M2B1600, 31 mmkV
VT1-6	66 kV POWER VT	6	6315	0	0237662	66 kV/110 V, 1000 VA, 31 mmkV
VT1-12	66 kV VT	6	6176	8	0180001	66 kV/110 V, 1000 VA, 31 mmkV
LM1-10	LAMP HOLDER INCL. FITTING	40	N/A	N/A	BUY-OUT	PHILIPS TANGO G2 BVP281 LED 180W 120W 220-240V SWB
	LAMP, FLOODLIGHT	40	N/A	N/A	BUY-OUT	120 W 220-240 V SWB
FS4-87	132 kV TUBULAR BUS	54	6230	7	0017528	132 kV, 31 mmkV
	INSUL POST STN 132 kV TUBE AL 120 mm	42	6000	4	0006319	120 X 4 mm AL TUBE 12,152 m
JB1	INTERFACE JUNCTION BOX	1	9101	3	0212591	N/A
JB2-3	POWER VT JB	2	9101	3	0116121	N/A
	METERING VT TRAY	2	9101	3	0116123	N/A
	VIRING JUNCTION BOX	2	9101	3	0116121	N/A
JB4-5	VT JUNCTION BOX	2	9101	3	0175713	N/A
JB6-12	CT JUNCTION BOX	7	9101	3	0175712	N/A
JB13-17	132 kV ISOLATOR JUNCTION BOX	5	9101	3	0212591	N/A
FB1-5	FLUG BOX	5	N/A	N/A	BUY-OUT	N/A

**NOTES**

1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

**CONSTRUCTION NOTES**

1. ALL FOUNDATIONS TO BE CAST 150 mm ABOVE GROUND LEVEL EXCEPT WHEN OTHERWISE SHOWN.
2. WEED KILLER SHALL BE APPLIED BEFORE AND AFTER COMPLETION OF YARD STONE SURFACING, AS PER GUIDELINE DTMG 0112

MASTER  
07 JUN 2018  
AECOM TRANSNET

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONIE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/00628/07

ISSUED FOR CONSTRUCTION:		GB	BS	CP	18-06-06
ISSUED FOR CONSTRUCTION:		JF	BS	CP	18-03-15
NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION:	GB	BS	CP	18-06-06
00	ISSUED FOR CONSTRUCTION:	JF	BS	CP	18-03-15

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	GB		18 06 06
				CHECKED	JF		18 06 06
				DESIGNED	DA		18 06 06
				CHECKED	BS		18 06 06

**OPERATING DIVISIONS**

TITLE	NAME	SIGN	DATE
PRE.ENG. / PRL.TECH./PR. ARCH			
NAME	C.P.M		
SIGNATURE			
REG. NUMBER	201270126		
SCALE:	1:200		

Transnet Capital Projects  
TOWER 121, PHOENIX ROAD, SANDHURST, 7600  
TABLE BAY BUILDING, TYGERBERG PARK, TEL: 021 940 1999  
185 LYS KRIGE DRIVE, PLATTENKLOOF, FAK: 086 672 2955  
8001

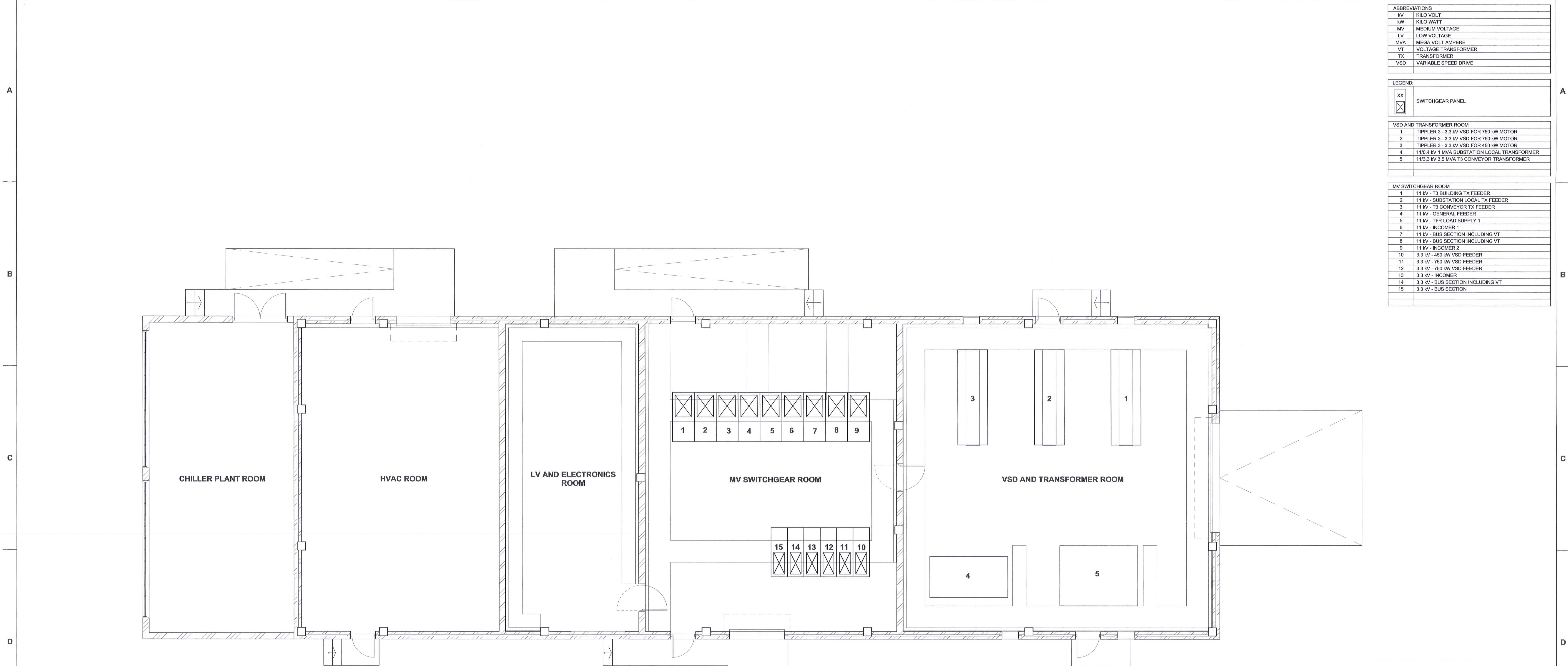
**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT**  
BULK POWER UPGRADE:  
NEW MAIN INTAKE SUBSTATION  
GENERAL ARRANGEMENT

PROJECT NUMBER	DD	FBS	DHS	TYPE	DRAWING NO.	SHEET	REV	ID
A01924701	-2	3	0	E	GA0003	01	01	AD

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS





ABBREVIATIONS	
kV	KILO VOLT
kW	KILO WATT
MV	MEDIUM VOLTAGE
LV	LOW VOLTAGE
MVA	MEGA VOLT AMPERE
VT	VOLTAGE TRANSFORMER
TX	TRANSFORMER
VSD	VARIABLE SPEED DRIVE

LEGEND:	
	SWITCHGEAR PANEL

VSD AND TRANSFORMER ROOM	
1	TIPPLER 3 - 3.3 kV VSD FOR 750 kW MOTOR
2	TIPPLER 3 - 3.3 kV VSD FOR 750 kW MOTOR
3	TIPPLER 3 - 3.3 kV VSD FOR 450 kW MOTOR
4	110.4 kV 1 MVA SUBSTATION LOCAL TRANSFORMER
5	11/3.3 kV 3.5 MVA T3 CONVEYOR TRANSFORMER

MV SWITCHGEAR ROOM	
1	11 kV - T3 BUILDING TX FEEDER
2	11 kV - SUBSTATION LOCAL TX FEEDER
3	11 kV - T3 CONVEYOR TX FEEDER
4	11 kV - GENERAL FEEDER
5	11 kV - TFR LOAD SUPPLY 1
6	11 kV - INCOMER 1
7	11 kV - BUS SECTION INCLUDING VT
8	11 kV - BUS SECTION INCLUDING VT
9	11 kV - INCOMER 2
10	3.3 kV - 450 kW VSD FEEDER
11	3.3 kV - 750 kW VSD FEEDER
12	3.3 kV - 750 kW VSD FEEDER
13	3.3 kV - INCOMER
14	3.3 kV - BUS SECTION INCLUDING VT
15	3.3 kV - BUS SECTION

AWAITING FINAL OFFERED MV EQUIPMENT DETAILS.

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- THE CONTRACTOR SHALL INSTALL ALL MEDIUM VOLTAGE EQUIPMENT TO ENSURE EASY ACCESS FOR MAINTENANCE PURPOSES.
- THE MINIMUM SPACING BETWEEN THE REAR AND SIDES OF THE SWITCHBOARDS TO THE SUBSTATION WALLS SHALL BE 1.5m.

- THE MONITORING AND CONTROL CABLES FOR THE SWITCHBOARDS SHALL BE TOP ENTRY AND THE POWER CABLES SHALL BE BOTTOM ENTRY, UNLESS OTHERWISE SPECIFIED OR REQUIRED BY OEM.
- SEE SUBSTATION M SINGLE LINE DIAGRAM FOR MORE DETAILS.
- THE CONTRACTOR SHALL PROVIDE ARC EXHAUST DUCTS FROM THE SWITCHBOARDS TO OUTSIDE OF THE BUILDING. NO ARC VENTING WITHIN THE MV SWITCHGEAR ROOM WILL BE ALLOWED.
- FINAL POSITIONS / ARRANGEMENT OF EQUIPMENT TO BE DETERMINED ON SITE IN CONJUNCTION WITH THE EMPLOYER.

**MASTER**  
07 JUN 2018  
**AECOM** **TRANSNET**

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONIE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

NO.	DESCRIPTION	BY				DATE
		GB	DA	CP	APPD	
01	ISSUED FOR CONSTRUCTION	GB	DA	CP	18-06-06	
02	ISSUED FOR CONSTRUCTION	GB	DA	CP	18-03-16	

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	GB		18 06 06
				CHECKED	JF		18 06 06
				DESIGNED	BS		18 06 06
				CHECKED	DA		18 06 06

OPERATING DIVISIONS				PR. ENG. / PR. TECH. / PR. ARCH			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				PR. ENG. / PR. TECH. / PR. ARCH	C P Y M		
				SIGNATURE			18 06 06
				REG. NUMBER	201270126		
				SCALE:	1:50		

Transnet Capital Projects

TRANSNET (Pty) Ltd (Trading as Transnet Capital Projects), REG. NO. 1900000000000  
TABLE BAY BUILDING, TYGEBERG PARK, TEL: 021 943 1999  
162 VON KRIGE DRIVE, PLATTEKLIP, FAX: 021 677 2455

**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT**  
**BULK POWER UPGRADE:**  
**SUBSTATION M**  
**MEDIUM VOLTAGE EQUIPMENT LAYOUT**

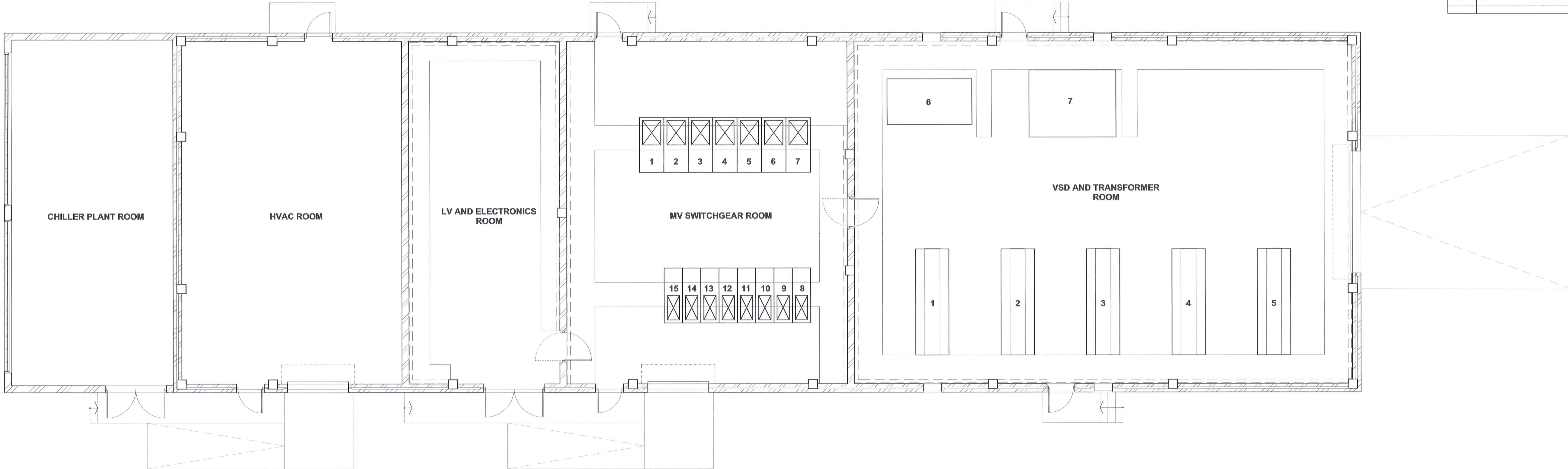
PROJECT NUMBER	ISS	FBS	BIS	TYPE	DRAWING NO.	SHEET	REV	ID
19247011	2	3	0	E	L A	015	01	AE

ABBREVIATIONS	
KV	KILO VOLT
KW	KILO WATT
MV	MEDIUM VOLTAGE
LV	LOW VOLTAGE
MVA	MEGA VOLT AMPERE
VT	VOLTAGE TRANSFORMER
TX	TRANSFORMER
VSD	VARIABLE SPEED DRIVE

LEGEND:	
XX	SWITCHGEAR PANEL

VSD AND TRANSFORMER ROOM	
1	TIPLER 3 - 3.3 KV VSD FOR 280 KW MOTOR
2	TIPLER 3 - 3.3 KV VSD FOR 280 KW MOTOR
3	TIPLER 3 - 3.3 KV VSD FOR 750 KW MOTOR
4	TIPLER 3 - 3.3 KV VSD FOR 750 KW MOTOR
5	TIPLER 3 - 3.3 KV VSD FOR 750 KW MOTOR
6	11 / 0.4 KV 1 MVA SUBSTATION LOCAL TRANSFORMER
7	11 / 3.3 KV 4.5 MVA T3 CONVEYOR TRANSFORMER

MV SWITCHGEAR ROOM	
1	11 KV - GENERAL FEEDER 1
2	11 KV - SUBSTATION LOCAL TX FEEDER
3	11 KV - T3 CONVEYOR TX FEEDER
4	11 KV - INCOMER 1
5	11 KV - BUS SECTION INCLUDING VT
6	11 KV - BUS SECTION INCLUDING VT
7	11 KV - INCOMER 2
8	3.3 KV - 750 KW VSD FEEDER
9	3.3 KV - 750 KW VSD FEEDER
10	3.3 KV - 750 KW VSD FEEDER
11	3.3 KV - 280 KW VSD FEEDER
12	3.3 KV - 280 KW VSD FEEDER
13	3.3 KV - INCOMER 1
14	3.3 KV - BUS SECTION INCLUDING VT
15	3.3 KV - BUS SECTION



AWAITING FINAL OFFERED MV EQUIPMENT DETAILS.

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE MEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- THE CONTRACTOR SHALL INSTALL ALL MEDIUM VOLTAGE EQUIPMENT TO ENSURE EASY ACCESS FOR MAINTENANCE PURPOSES.
- THE MINIMUM SPACING BETWEEN THE REAR AND SIDES OF THE SWITCHBOARDS TO THE SUBSTATION WALLS SHALL BE 1.5m.
- THE MONITORING AND CONTROL CABLES FOR THE SWITCHBOARDS SHALL BE TOP ENTRY AND THE POWER CABLES SHALL BE BOTTOM ENTRY, UNLESS OTHERWISE SPECIFIED OR REQUIRED BY OEM.
- SEE SUBSTATION N SINGLE LINE DIAGRAM FOR MORE DETAILS.
- THE CONTRACTOR SHALL PROVIDE ARC EXHAUST DUCTS FROM THE SWITCHBOARDS TO OUTSIDE OF THE BUILDING. NO ARC VENTING WITHIN THE MV SWITCHGEAR ROOM WILL BE ALLOWED.
- FINAL POSITIONS / ARRANGEMENT OF EQUIPMENT TO BE DETERMINED ON SITE IN CONJUNCTION WITH THE EMPLOYER.

MASTER  
07 JUN 2018

**AECOM**

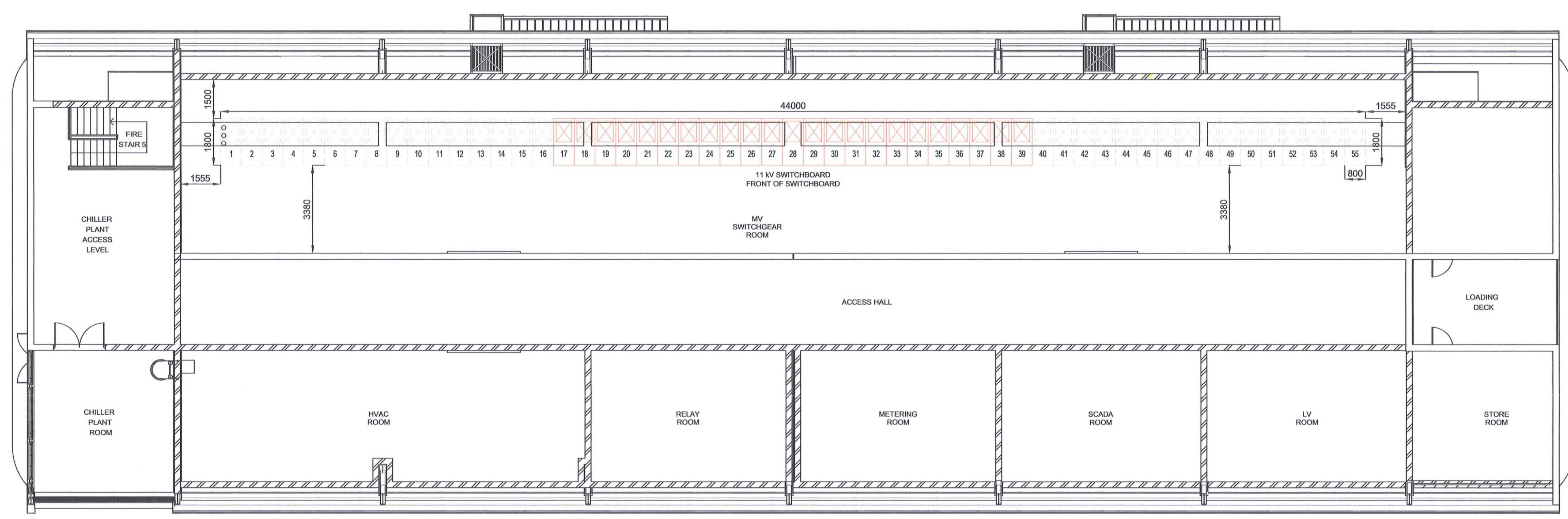
CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONIE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

CONTRACTOR / CONSULTANT				
TITLE	NAME	SIGN	DATE	
OPERATING DIVISIONS				
TITLE	NAME	SIGN	DATE	

TRANSNET CAPITAL PROJECTS				
TITLE	NAME	SIGN	DATE	
DRAWN	GB	[Signature]	18 05 06	
CHECKED	JF		18 05 06	
DESIGNED	BS		18 05 06	
CHECKED	DA		18 05 06	
PR.ENG. / PR.TECH./PR. ARCH				
TITLE	NAME	SIGN	DATE	
SIGNATURE				
NAME	C PVM	[Signature]	18 05 06	
REG. NUMBER	257270126			
SCALE	1:50			

Transnet Capital Projects		
TRANSNET LTD (PROMOTED AS TRANSNET CAPITAL PROJECTS) REG. NO. 196660008 TABLE BAY BUILDING, TYGERSBURG PARK, TEL: 021 940 1999 165 LEYS KRIGE DRIVE, PLATTENKOP, FAX: 021 947 2655		
<b>PORT OF SALDANHA</b>		
IRON ORE TIPLER 3 PROJECT BULK POWER UPGRADE: SUBSTATION N MEDIUM VOLTAGE EQUIPMENT LAYOUT		
PROJECT NUMBER	001	1912470112
ISS	0	300
DSE	0	0
TYPE	LA	0016
DRAWING NO.	0	101
SHEET	0	1
REV	0	1
ID		AE

DRAWING NO.	REFERENCE
	REFERENCE DRAWINGS



11KV SWITCHBOARD:	
1	TNPA DEDICATED PANEL (FUTURE)
2	TNPA DEDICATED PANEL (FUTURE)
3	TNPA DEDICATED PANEL (FUTURE)
4	TNPA DEDICATED PANEL (FUTURE)
5	TNPA DEDICATED PANEL (FUTURE)
6	TNPA DEDICATED PANEL (FUTURE)
7	PFC FEEDER 1 (FUTURE)
8	WHARF FEEDER 1 (FUTURE)
9	STOCKYARD SOUTH FEEDER 1 (FUTURE)
10	STOCKYARD NORTH FEEDER 1 (FUTURE)
11	SUB I FEEDER 1 (FUTURE)
12	SUB L FEEDER 1 (FUTURE)
13	SUB F FEEDER 1 (FUTURE)
14	SUB E FEEDER 1 (FUTURE)
15	SUB C FEEDER 1 (FUTURE)
16	SUB B FEEDER 1 (FUTURE)
17	SUB N FEEDER 1
18	SUB M FEEDER 1
19	SUB K FEEDER 1
20	SUB J FEEDER 1
21	SUB H FEEDER 1
22	SUB A FEEDER 1
23	INCOMER TRANSFORMER 1
24	BUS SECTION
25	BUS SECTION
26	BUS SECTION
27	BUS SECTION
28	INCOMER TRANSFORMER 2
29	BUS SECTION
30	BUS SECTION
31	BUS SECTION
32	BUS SECTION
33	INCOMER TRANSFORMER 3
34	SUB A FEEDER 2
35	SUB H FEEDER 2
36	SUB J FEEDER 2
37	SUB K FEEDER 2
38	SUB M FEEDER 2
39	SUB N FEEDER 2
40	SUB B FEEDER 2 (FUTURE)
41	SUB C FEEDER 2 (FUTURE)
42	SUB E FEEDER 2 (FUTURE)
43	SUB F FEEDER 2 (FUTURE)
44	SUB L FEEDER 2 (FUTURE)
45	SUB I FEEDER 2 (FUTURE)
46	STOCKYARD NORTH FEEDER 2 (FUTURE)
47	STOCKYARD SOUTH FEEDER 2 (FUTURE)
48	WHARF FEEDER 2 (FUTURE)
49	PFC FEEDER 2 (FUTURE)
50	TNPA DEDICATED PANEL (FUTURE)
51	TNPA DEDICATED PANEL (FUTURE)
52	TNPA DEDICATED PANEL (FUTURE)
53	TNPA DEDICATED PANEL (FUTURE)
54	TNPA DEDICATED PANEL (FUTURE)
55	TNPA DEDICATED PANEL (FUTURE)

LEGEND:	
	SWITCHGEAR PANEL
	FUTURE SWITCHGEAR PANEL

AWAITING FINAL OFFERED MV EQUIPMENT DETAILS.

- NOTES**
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE MEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - THE CONTRACTOR SHALL INSTALL ALL MEDIUM VOLTAGE EQUIPMENT TO ENSURE EASY ACCESS FOR MAINTENANCE PURPOSES.
  - THE MINIMUM SPACING BETWEEN THE REAR AND SIDES OF THE SWITCHBOARDS TO THE SUBSTATION WALLS SHALL BE MINIMUM 1.5m.
  - THE MONITORING AND CONTROL CABLES FOR THE SWITCHBOARDS SHALL BE TOP ENTRY AND THE POWER CABLES SHALL BE BOTTOM ENTRY, UNLESS OTHERWISE SPECIFIED.
  - THE CONTRACTOR SHALL ENSURE THAT THE SWITCHGEAR PANELS ARE INSTALLED IN SUCH A MANNER FOR EASY INSTALLATION OF THE POWER CABLES TAKING INTO CONSIDERATION THE BEAMS UNDERNEATH THE SUBSTATION FLOOR.
  - SEE NEW MAIN INTAKE SUBSTATION SINGLE LINE DIAGRAM FOR MORE DETAILS.
  - THE CONTRACTOR SHALL PROVIDE ARC EXHAUST DUCTS FROM THE SWITCHBOARDS TO THE DEDICATED BUILDING DUCTS. NO ARC VENTING WITHIN THE MV SWITCHGEAR ROOM WILL BE ALLOWED.
  - FINAL POSITIONS / ARRANGEMENT OF EQUIPMENT TO BE DETERMINED ON SITE IN CONJUNCTION WITH THE EMPLOYER.

MASTER  
07 JUN 2018  
AECOM TRANSNET

**AECOM**  
CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONIE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
ISSUED FOR CONSTRUCTION:	GB DA CP	PR.ENG. / PR.TECH./PR. ARCH	C PYM
ISSUED FOR CONSTRUCTION:	GB DA CP	SIGNATURE	20/07/18
NO.	DESCRIPTION	REG. NUMBER	20/07/18
BY	CHKD	APPD	DATE

OPERATING DIVISIONS	
TITLE	NAME
PR.ENG. / PR.TECH./PR. ARCH	C PYM
SIGNATURE	20/07/18
REG. NUMBER	20/07/18
SCALE:	1:100

**Transnet Capital Projects**

TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) REG. NO. 196660006  
TABLE BAY BUILDING, TYGERBERG PARK  
103 LYS HIRSE DRIVE, PLATTEKLOOF, TEL: 021 940 1990  
8001 FAX: 021 940 2455

**TRANSNET**

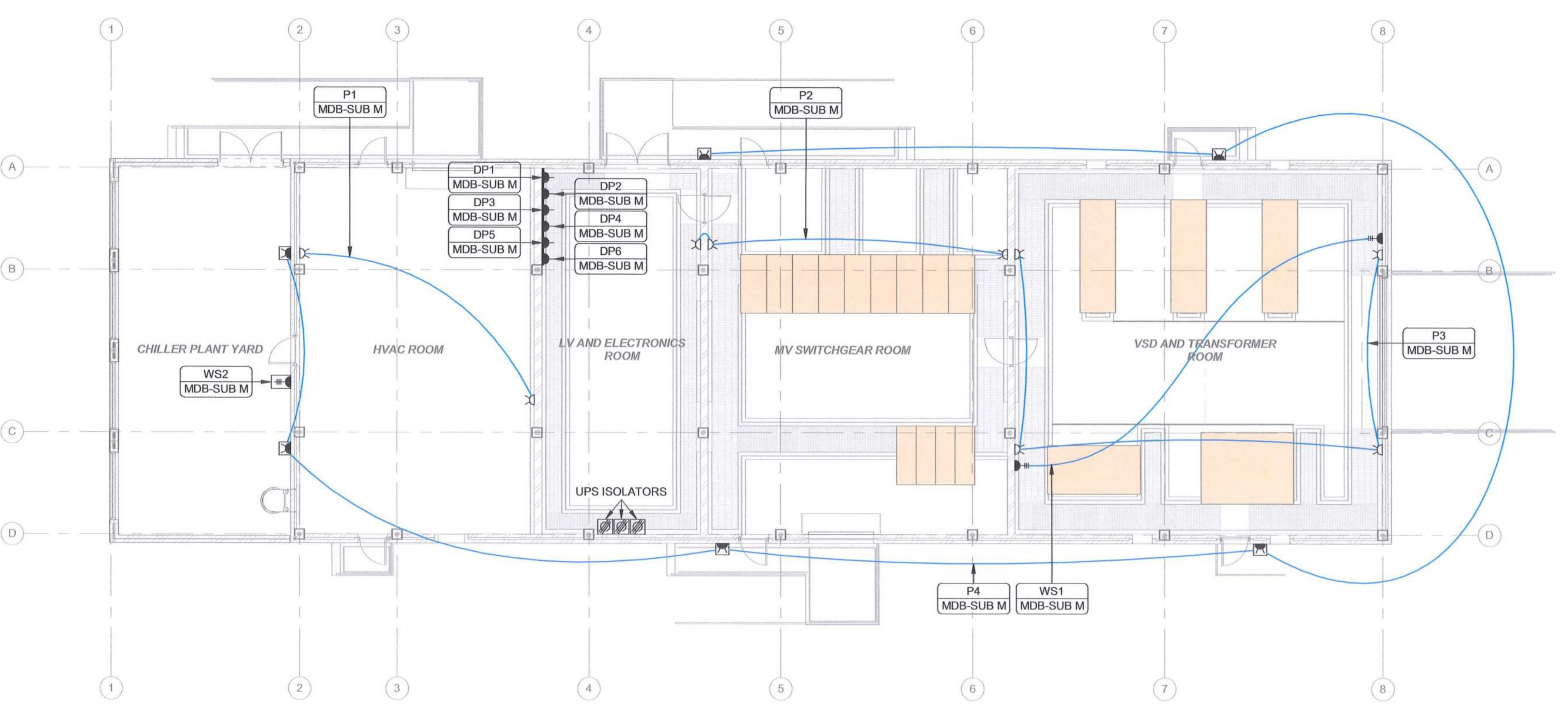
**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT**  
**BULK POWER UPGRADE:**  
**NEW MAIN INTAKE SUBSTATION**  
**MEDIUM VOLTAGE EQUIPMENT LAYOUT**

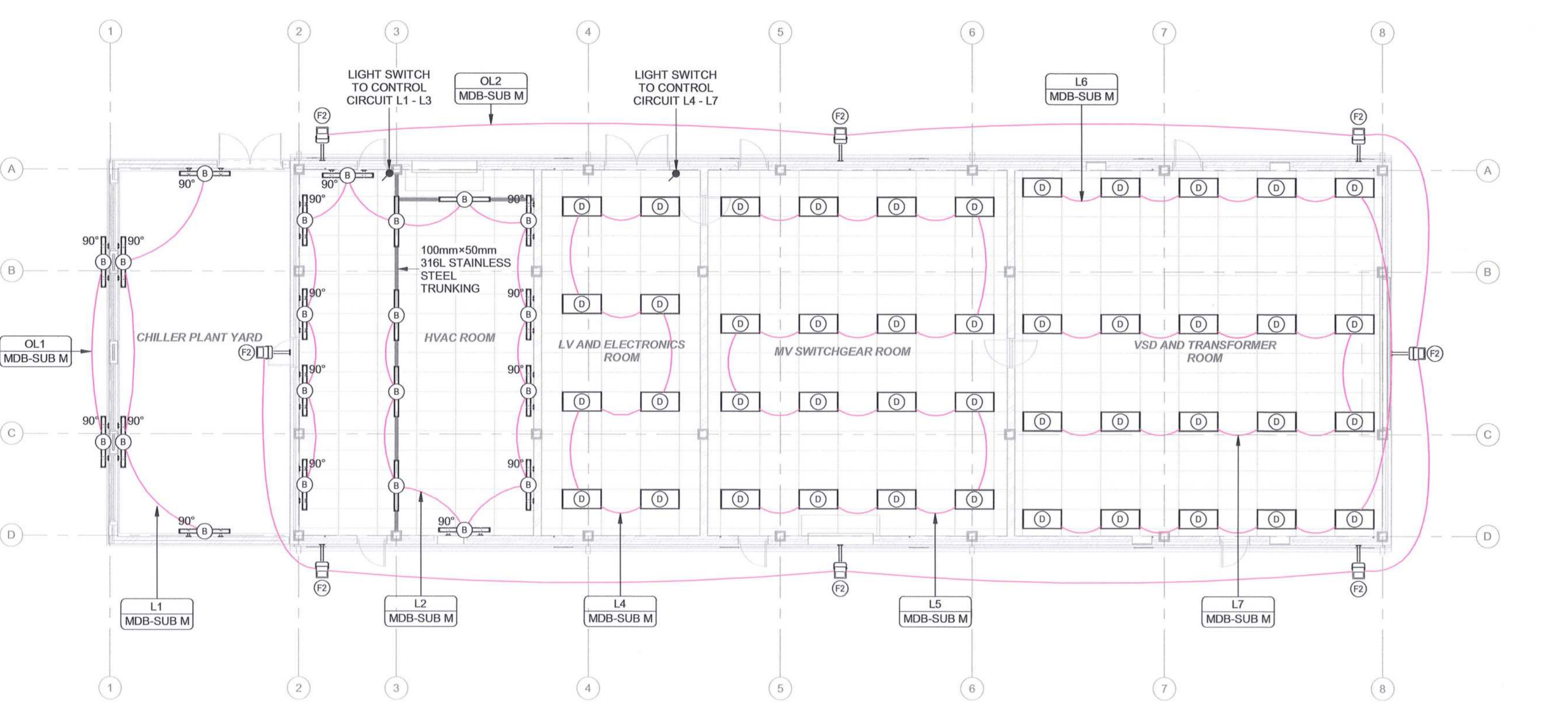
PROJECT NUMBER	001	001	001	001	001	001	001	001	001
1	2	3	4	5	6	7	8	9	10

SCALE: 1:100

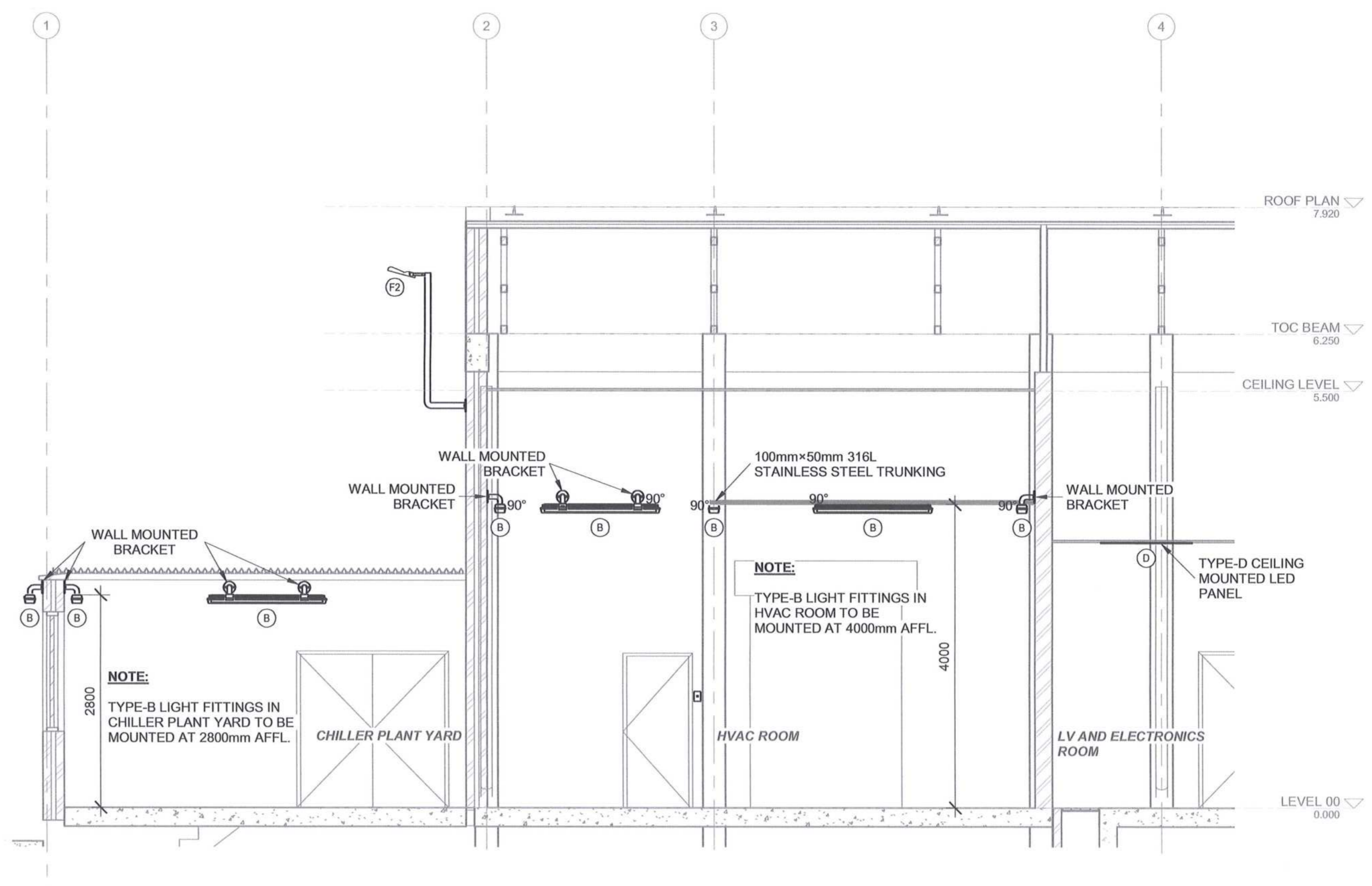
DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS



1 | 00 LEVEL - SMALL POWER  
LA-0032-01 SCALE 1:100

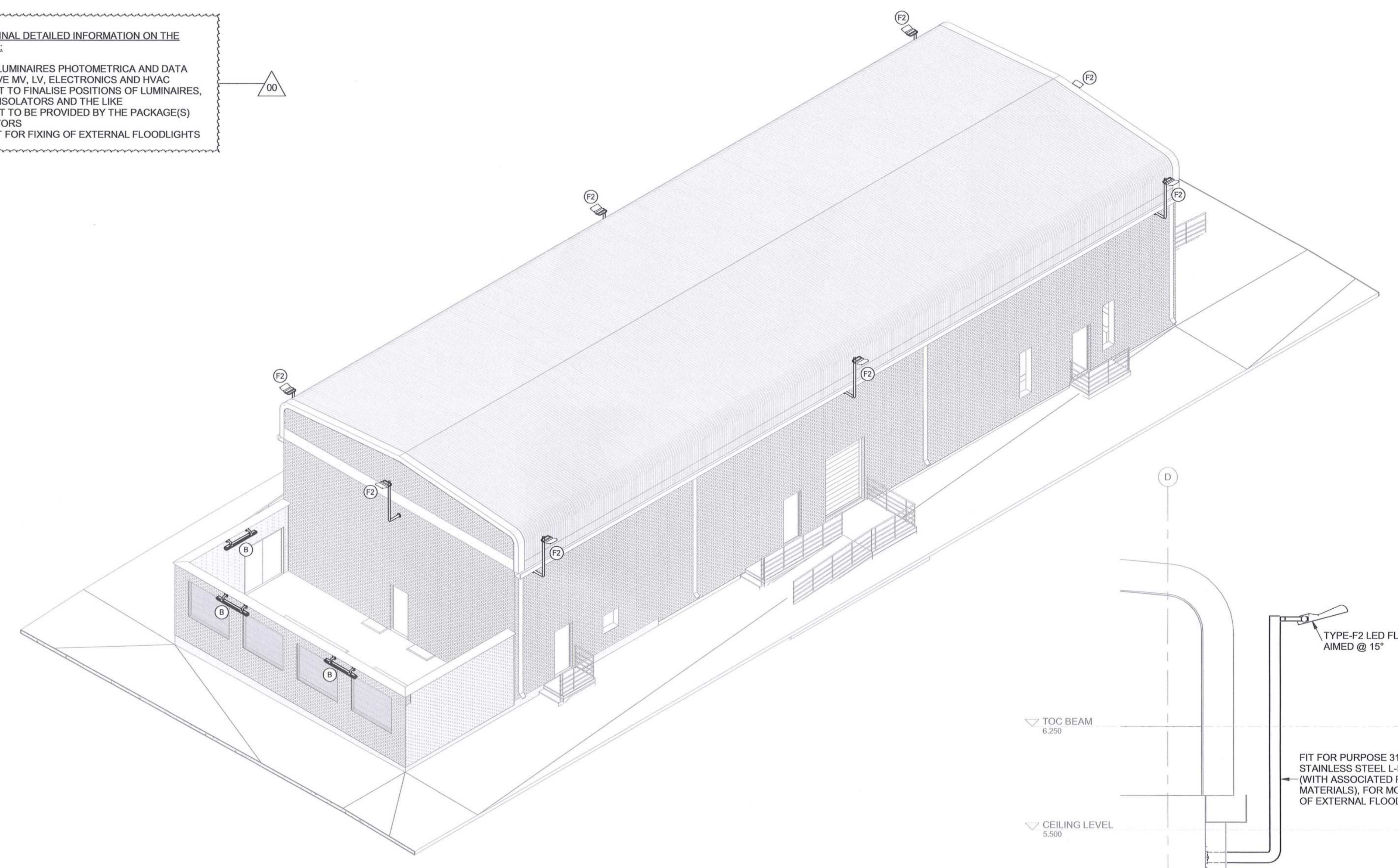


3 | LEVEL 00 - LIGHTING  
LA-0032-01 SCALE 1:100



2 | TYPICAL SECTION  
LA-0032-01 SCALE 1:30

AWAITING FINAL DETAILED INFORMATION ON THE FOLLOWING:  
 • OFFERED LUMINAIRE PHOTOMETRICA AND DATA  
 • RESPECTIVE MV, LV, ELECTRONICS AND HVAC EQUIPMENT TO FINALISE POSITIONS OF LUMINAIRE, SOCKETS, ISOLATORS AND THE LINE  
 • EQUIPMENT TO BE PROVIDED BY THE PACKAGE(S) CONTRACTORS  
 • L-BRACKET FOR FIXING OF EXTERNAL FLOODLIGHTS



4 | TYPICAL 3D VIEW - EXTERNAL LIGHTING  
LA-0032-01 SCALE N.T.S

- LEGEND:**
- TYPE A SURFACE MOUNTED 2 x 10W (4000 KELVIN) LED UP / DOWN LIGHT COMPLETE AS PER SPECIFICATION
  - TYPE B SURFACE OR BRACKET MOUNTED 60W (4000 KELVIN) LED VAPOUR PROOF LUMINAIRE COMPLETE AS PER SPECIFICATION
  - TYPE B 45° OR 90° (DOWN) INDICATES THE ANGLE OF THE BRACKET TO BE USED TO MOUNT THE LUMINAIRE
  - TYPE C SURFACE MOUNTED FLEXIBLE SW / METER (4000 KELVIN) LED STRIP LIGHT COMPLETE AS PER SPECIFICATION
  - TYPE D RECESSED 60W (4000 KELVIN) LED PANEL LUMINAIRE 600 x 1200 COMPLETE AS PER SPECIFICATION
  - TYPE E SURFACE MOUNTED 18W (3000 KELVIN) LED RECTANGULAR BULKHEAD COMPLETE AS PER SPECIFICATION
  - TYPE F1 SURFACE MOUNTED 210W (3000 KELVIN) LED FLOODLIGHT COMPLETE AS PER SPECIFICATION
  - TYPE F2 SURFACE MOUNTED 120W (3000 KELVIN) LED FLOODLIGHT COMPLETE AS PER SPECIFICATION
- 1-DB-** CIRCUIT DESCRIPTION INDICATING CIRCUIT NUMBER AND DISTRIBUTION BOARD THE CIRCUIT IS BEING FED FROM
- 1 SINGLE LEVER NORMAL LIGHT SWITCH COMPLETE AS PER SPECIFICATION
  - 2 SINGLE LEVER TWO WAY LIGHT SWITCH COMPLETE AS PER SPECIFICATION
  - 3 DOUBLE LEVER TWO WAY LIGHT SWITCH COMPLETE AS PER SPECIFICATION
  - 4 TRIPLE LEVER TWO WAY LIGHT SWITCH COMPLETE AS PER SPECIFICATION
  - 5 SURFACE MOUNTED COMBINED (2x SANS 164-1 AND 2x SANS 164-2 TYPE) SWITCHED SOCKET OUTLETS COMPLETE AS PER SPECIFICATION
  - 6 FLUSH MOUNTED COMBINED (2x SANS 164-1 AND 2x SANS 164-2 TYPE) SWITCHED SOCKET OUTLETS COMPLETE AS PER SPECIFICATION
  - 7 COMBINATION OF POWER SKIRTING/TRUNKING MOUNTED BLUE TOP SINGLE SWITCHED SOCKET OUTLET AND 1x POWER SKIRTING/TRUNKING MOUNTED BLUE TOP SANS 164-2 TYPE SWITCHED SOCKET OUTLET COMPLETE AS PER SPECIFICATION
  - 8 FLUSH MOUNTED BLUE (IPS) DOUBLE SWITCHED SOCKET OUTLET COMPLETE AS PER SPECIFICATION
  - 9 OUTDOOR TYPE FLUSH MOUNTED COMBINED (1x SANS 164-1 AND 1x SANS 164-2 TYPE) SWITCHED SOCKET OUTLETS COMPLETE AS PER SPECIFICATION
  - 10 SEMI-FLUSH MOUNTED, PURPOSE ENGINEERED PLASTIC, 32A, 5 PIN, LOCKABLE SOCKET OUTLET COMPLETE AS PER SPECIFICATION
  - 11 32A, 5 PIN, LOCKABLE SOCKET OUTLET, MOUNTED WITHIN PURPOSE MADE SURFACE MOUNTED PPS 316L STAINLESS STEEL ENCLOSURE COMPLETE AS PER SPECIFICATION
  - 12 FLUSH MOUNTED 60-63A, THREE POLE ISOLATOR COMPLETE AS PER SPECIFICATION
  - 13 DISTRIBUTION BOARD

- ABBREVIATIONS:**
- MV - MEDIUM VOLTAGE
  - LV - LOW VOLTAGE
  - VSD - VARIABLE SPEED DRIVE
  - HVAC - HEATING, VENTILATION & AIR CONDITIONING

- NOTES**
1. DO NOT SCALE DRAWINGS - ONLY DIMENSIONS SHOWN TO BE USED.
  2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  3. FINAL POSITION OF ALL ELECTRICAL EQUIPMENT SHALL BE CONFIRMED ON SITE, IN CONJUNCTION WITH, AND APPROVAL OF, THE EMPLOYER.
  4. CONTRACTOR TO NOTE THAT ALL LIGHTING IS SWITCHED VIA DB MOUNTED CONTACTORS AND SUFFICIENT CONDUITING IS TO BE ALLOWED FOR.
  5. ALL ELECTRONIC SERVICES CABLING, SHALL BE DISTRIBUTED THROUGH THE BUILDING VIA SEPARATE CONDUITS AND DUCTING INFRASTRUCTURE.

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**AECOM**

CAPE TOWN OFFICE  
 WATERSIDE PLACE, SOUTH GATE  
 TYGER WATERFRONT  
 CARL GROUJIE DRIVE  
 TEL: +27 (0)21 950 7500  
 FAX: +27 (0)21 950 7502  
 REG. No. 1966/006626/07

NO	ISSUED FOR CONSTRUCTION	DC	BS	CP	DATE
00	ISSUED FOR CONSTRUCTION	DC	BS	CP	2018-06-25

**REVISIONS**

This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

CONTRACTOR/CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWING	DC		18   06   25
				CHECKED	DD		18   06   25
				DESIGNED	LK		18   06   25
				CHECKED	BS		18   06   25

**OPERATING DIVISIONS**

TITLE	NAME	SIGN	DATE
PR.ENG./PR.TECH./PR.ARCH	C. F. F. M.		18   06   25

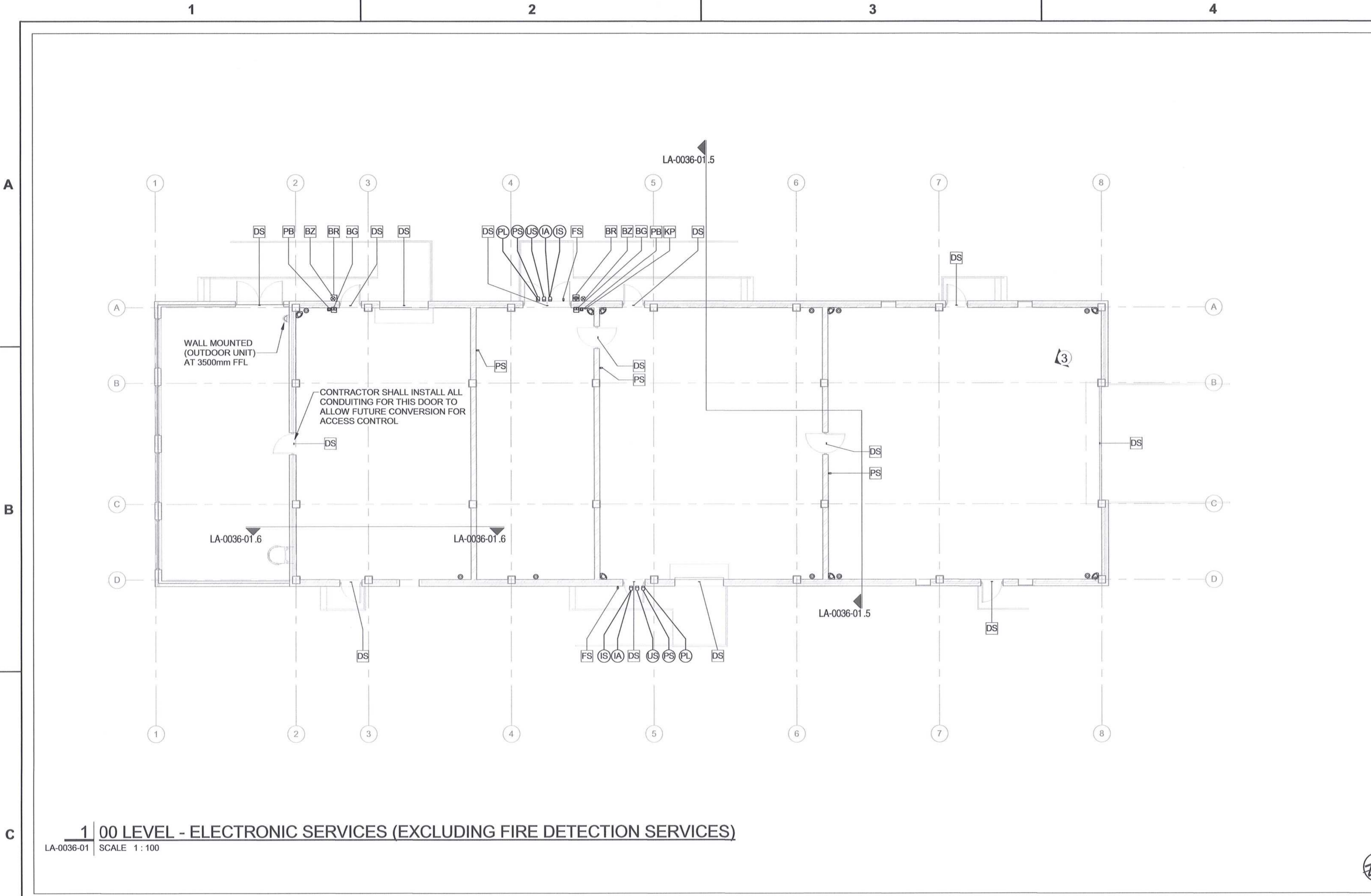
REG. NUMBER: 2012/0136  
 SCALE: AS SHOWN

Transnet Capital Projects  
 TRANSNET LTD (INCORPORATED IN SOUTH AFRICA) (REG. NO. 2000000000000000)  
 TABLE BAY BUILDING, TYGERBERG PARK  
 163 LYS KRIGE DRIVE, PLATTENLOEF, 7401  
 TEL: 021 940 1999  
 FAX: 021 940 2459

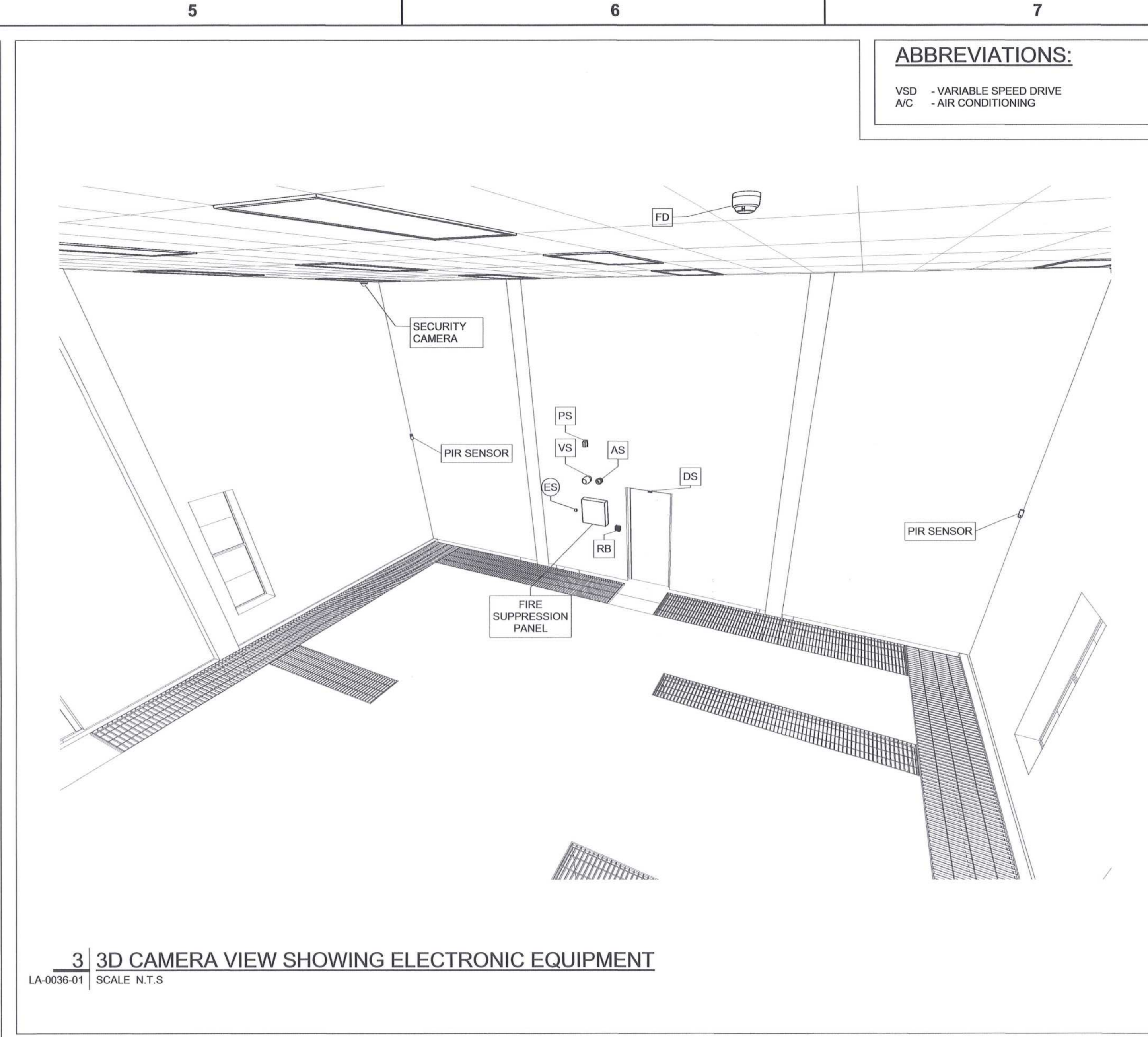
**PORT OF SALDANHA**

IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE:  
 SUBSTATION M  
 LEVEL 00 SMALL POWER AND LIGHTING LAYOUT

PROJECT NUMBER: 19247012300  
 DIS: E  
 TYPE: LA  
 DRAWING NO: 0032  
 SHEET: 01  
 REV: 00  
 ID: AE



1 00 LEVEL - ELECTRONIC SERVICES (EXCLUDING FIRE DETECTION SERVICES)  
LA-0036-01 SCALE 1:100



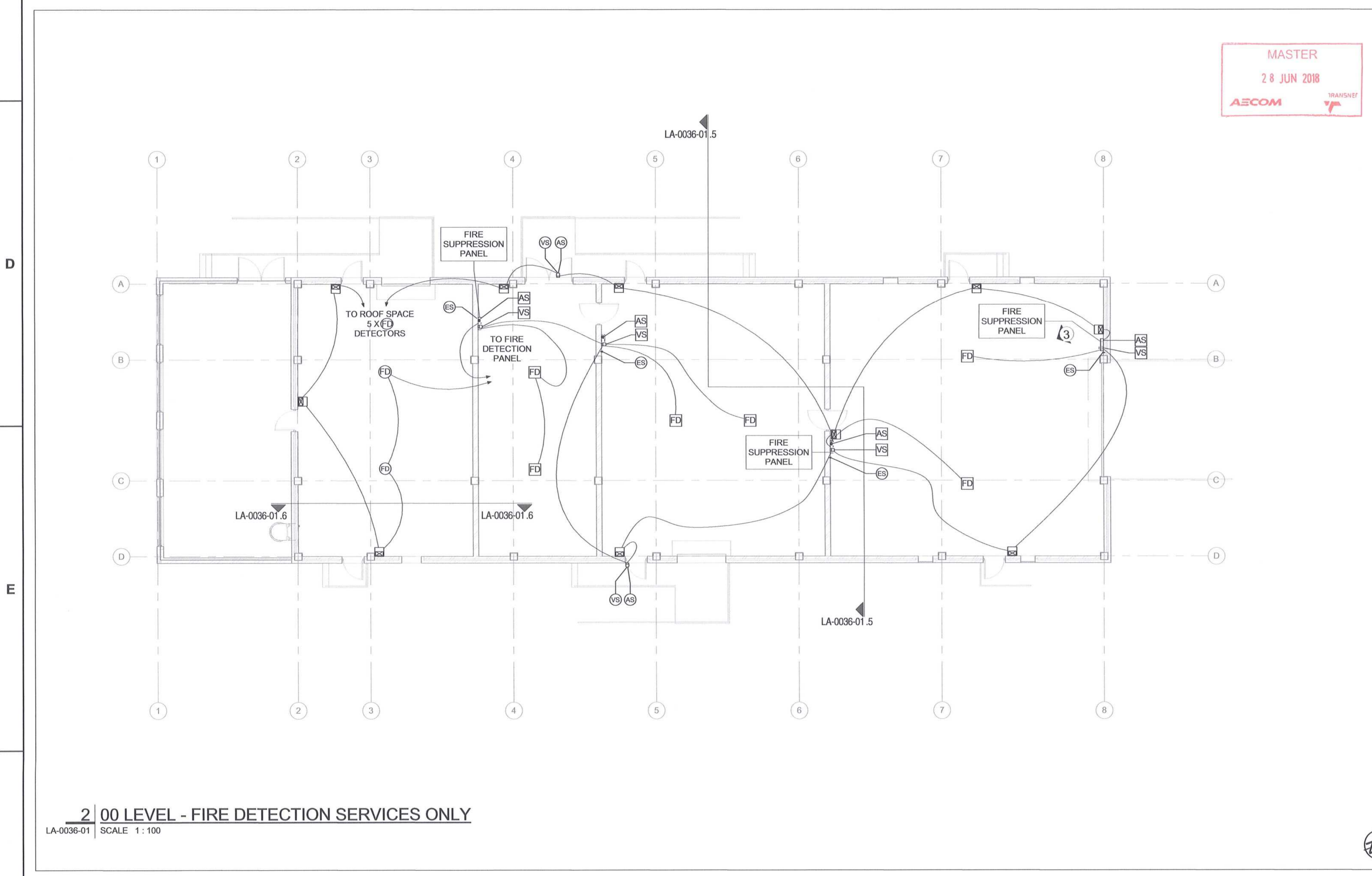
3 3D CAMERA VIEW SHOWING ELECTRONIC EQUIPMENT  
LA-0036-01 SCALE N.T.S.

**ABBREVIATIONS:**

VSD - VARIABLE SPEED DRIVE  
A/C - AIR CONDITIONING

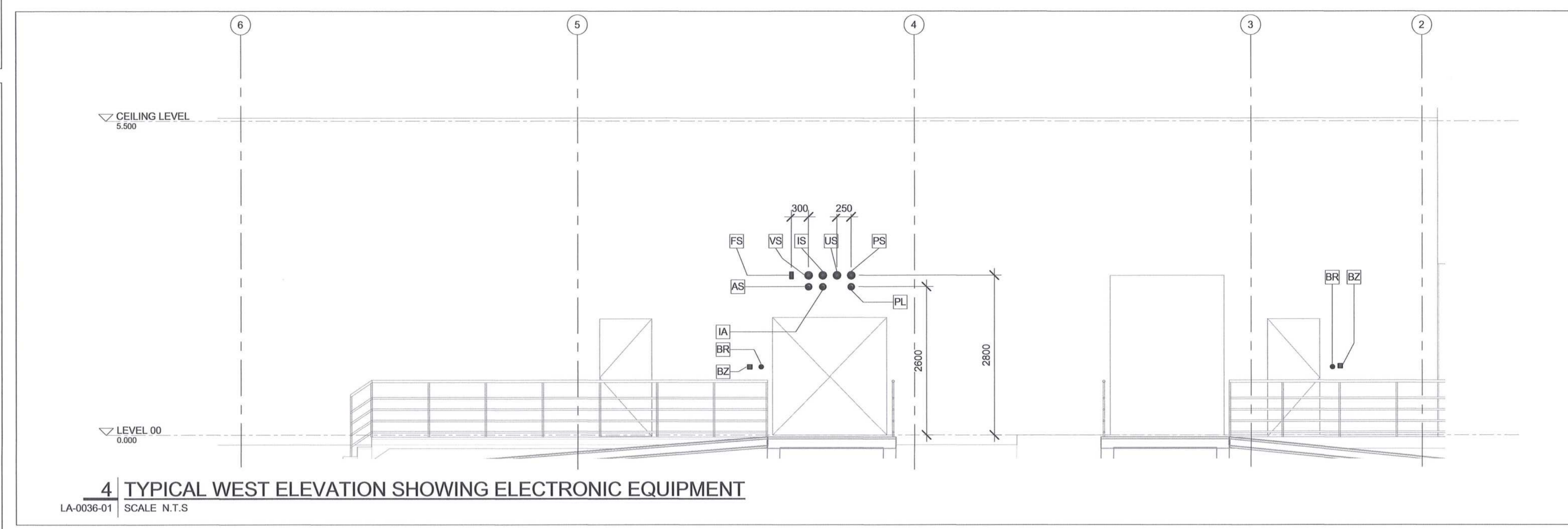
**LEGEND:**

- FD FIRE DETECTION - MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION
- VS FIRE DETECTION - VISUAL FIRE SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- AS FIRE DETECTION - AUDIBLE FIRE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- FD FIRE DETECTION - CONVENTIONAL / NON-ADDRESSABLE MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION
- VS FIRE DETECTION - SUPPRESSION SYSTEM VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- AS FIRE DETECTION - SUPPRESSION SYSTEM AUDIBLE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- RB FIRE DETECTION - RED, RESETTABLE, BREAK GLASS UNIT (MANUAL CALL POINT) COMPLETE AS PER SPECIFICATION
- IO FIRE DETECTION - INPUT / OUTPUT INTERFACE UNIT COMPLETE AS PER SPECIFICATION
- FS FIRE DETECTION - LOCAL CONTROL ADDRESSABLE FIRE SUPPRESSION PANEL COMPLETE AS PER SPECIFICATION
- ES FIRE DETECTION - SUPPRESSION SYSTEM EMERGENCY STOP COMPLETE AS PER SPECIFICATION
- IB ACCESS CONTROL - BIOMETRIC FINGER PRINT READER COMPLETE AS PER SPECIFICATION
- BZ ACCESS CONTROL - DOOR BUZZER COMPLETE AS PER SPECIFICATION
- FB ACCESS CONTROL - DOOR EXIT RELEASE BUTTON COMPLETE AS PER SPECIFICATION
- BG ACCESS CONTROL - GREEN, RESETTABLE, BREAK GLASS UNIT COMPLETE AS PER SPECIFICATION
- BS INTRUDER ALARM - DOOR (OPEN/CLOSE) SENSOR FOR NORMAL AND ROLLER SHUTTER DOORS COMPLETE AS PER SPECIFICATION
- IS INTRUDER ALARM - VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- UA INTRUDER ALARM - AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- KP INTRUDER ALARM - KEYPAD COMPLETE AS PER SPECIFICATION
- IA INTRUDER ALARM - PIR INTRUDER DETECTOR COMPLETE AS PER SPECIFICATION
- ES CCTV - SECURITY CAMERA COMPLETE AS PER SPECIFICATION
- FS BUILDING MANAGEMENT SYSTEM - PRESSURE SENSOR COMPLETE AS PER SPECIFICATION
- VS BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- AS BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- LA BUILDING MANAGEMENT SYSTEM - UPS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION (TO INDICATE THAT A UPS IS LIVE)
- FS BUILDING MANAGEMENT SYSTEM - FIREMAN SWITCH COMPLETE AS PER SPECIFICATION

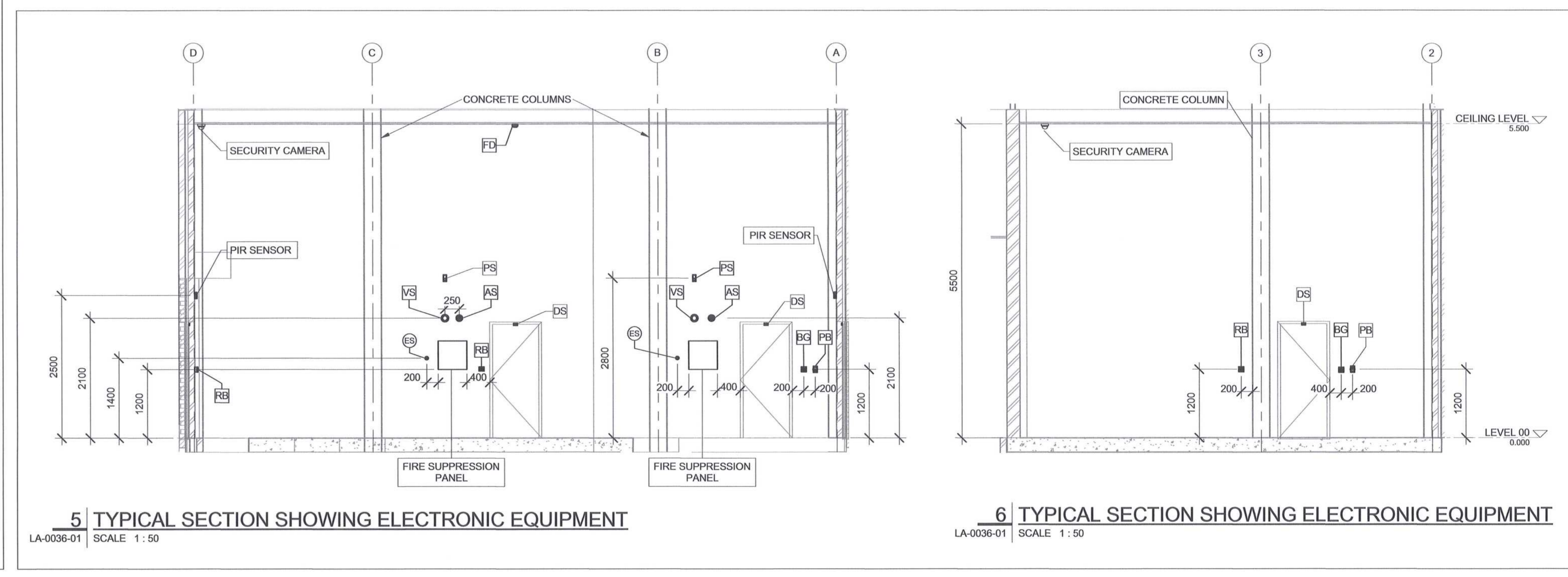


2 00 LEVEL - FIRE DETECTION SERVICES ONLY  
LA-0036-01 SCALE 1:100

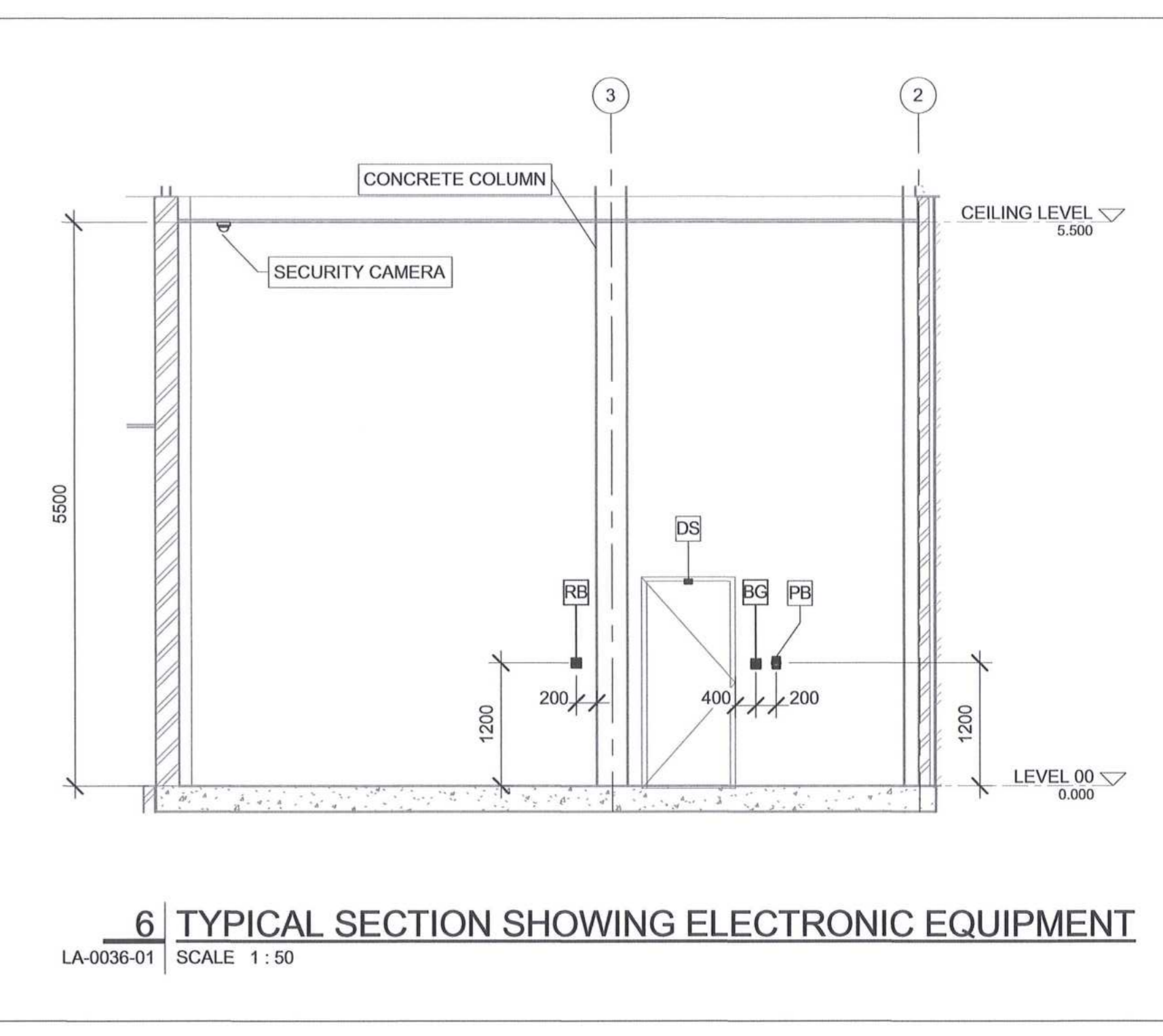
MASTER  
28 JUN 2018  
AECOM



4 TYPICAL WEST ELEVATION SHOWING ELECTRONIC EQUIPMENT  
LA-0036-01 SCALE N.T.S.



5 TYPICAL SECTION SHOWING ELECTRONIC EQUIPMENT  
LA-0036-01 SCALE 1:50



6 TYPICAL SECTION SHOWING ELECTRONIC EQUIPMENT  
LA-0036-01 SCALE 1:50

**NOTES**

1. DO NOT SCALE DRAWINGS - ONLY DIMENSIONS SHOWN TO BE USED.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON SITE AND NOTIFY THE NEG SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
3. FINAL DESIGNS TO BE UNDERTAKEN BY SPECIALIST CONTRACTOR(S) (OEM/S).
4. FINAL POSITION OF ALL ELECTRONIC EQUIPMENT SHALL BE CONFIRMED ON SITE, IN CONJUNCTION WITH, AND APPROVAL OF, THE EMPLOYER.
5. ALL ELECTRICAL SERVICES CABLING, SHALL BE DISTRIBUTED THROUGH THE BUILDING VIA SEPARATE CONDUITS AND DUCTING INFRASTRUCTURE.

**REFERENCE DRAWINGS**

DRAWING NO.	REFERENCE
1	
2	
3	
4	
5	
6	
7	
8	

**AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:**

- ICT
- CCTV
- ACCESS CONTROL
- INTRUDER ALARM
- UPS
- OTHER ASSOCIATED SYSTEMS
- RESPECTIVE EQUIPMENT DETAILS SUPPLIED BY CONVEYOR CONTRACTOR
- FIRE DETECTION
- ALL LABELLING OF EQUIPMENT INCLUDING EXTERNAL INDICATION LIGHTS SIGNAGE

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE

TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1966000028007

**CONTRACTOR/CONSULTANT**

TITLE	NAME	SIGN	DATE

**FRANSNET CAPITAL PROJECTS**

TITLE	NAME	SIGN	DATE
DRAWN	DD	18	06
CHECKED	MA	18	06
DESIGNED	LK	18	06
CHECKED	ES	18	06

**OPERATING DIVISIONS**

TITLE	NAME	SIGN	DATE

**REVISIONS**

NO	ISSUED FOR CONSTRUCTION	DESCRIPTION	BY	CHKD	APPD	DATE
00	00	00	00	00	00	2018-06-18

This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

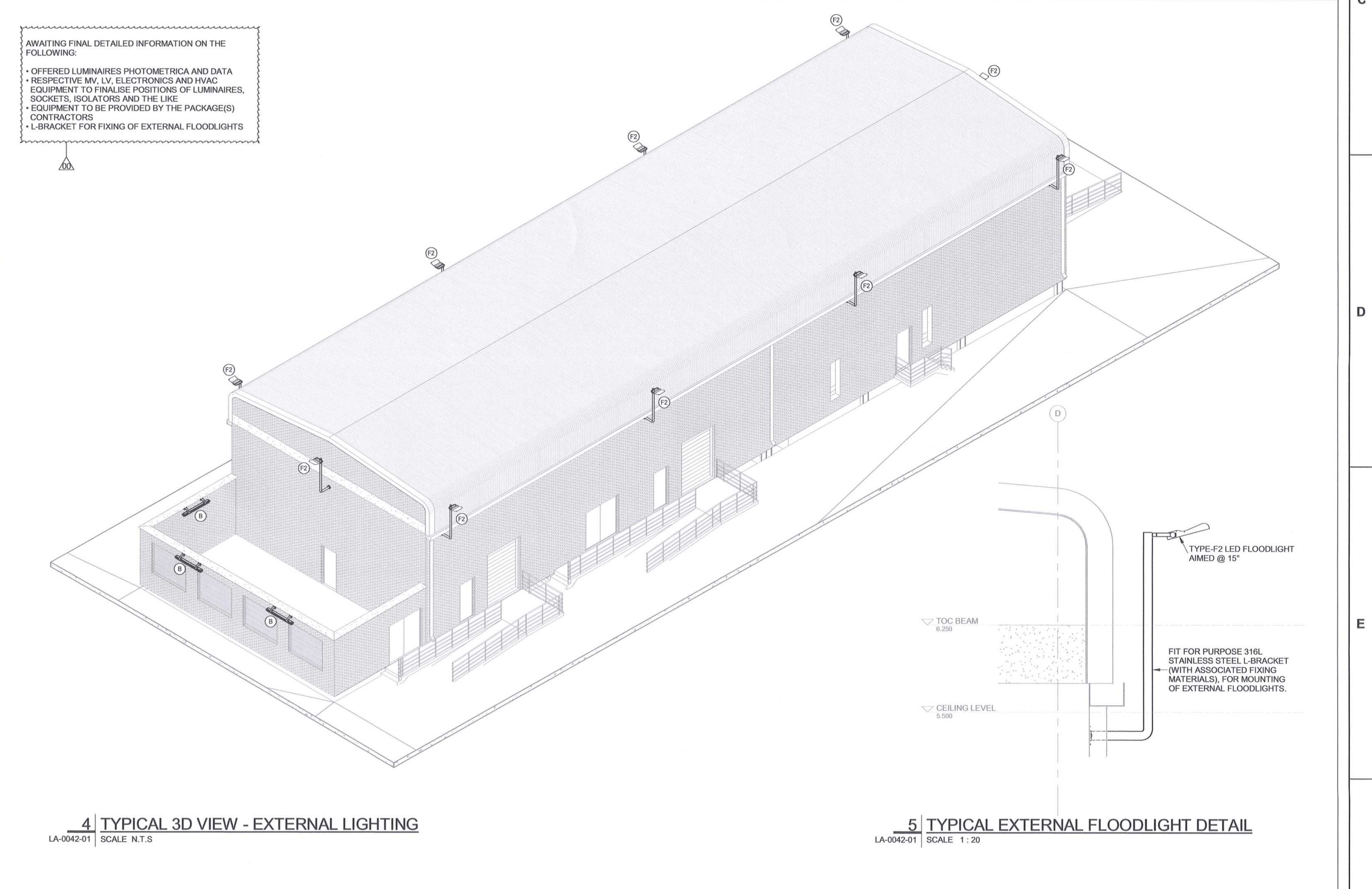
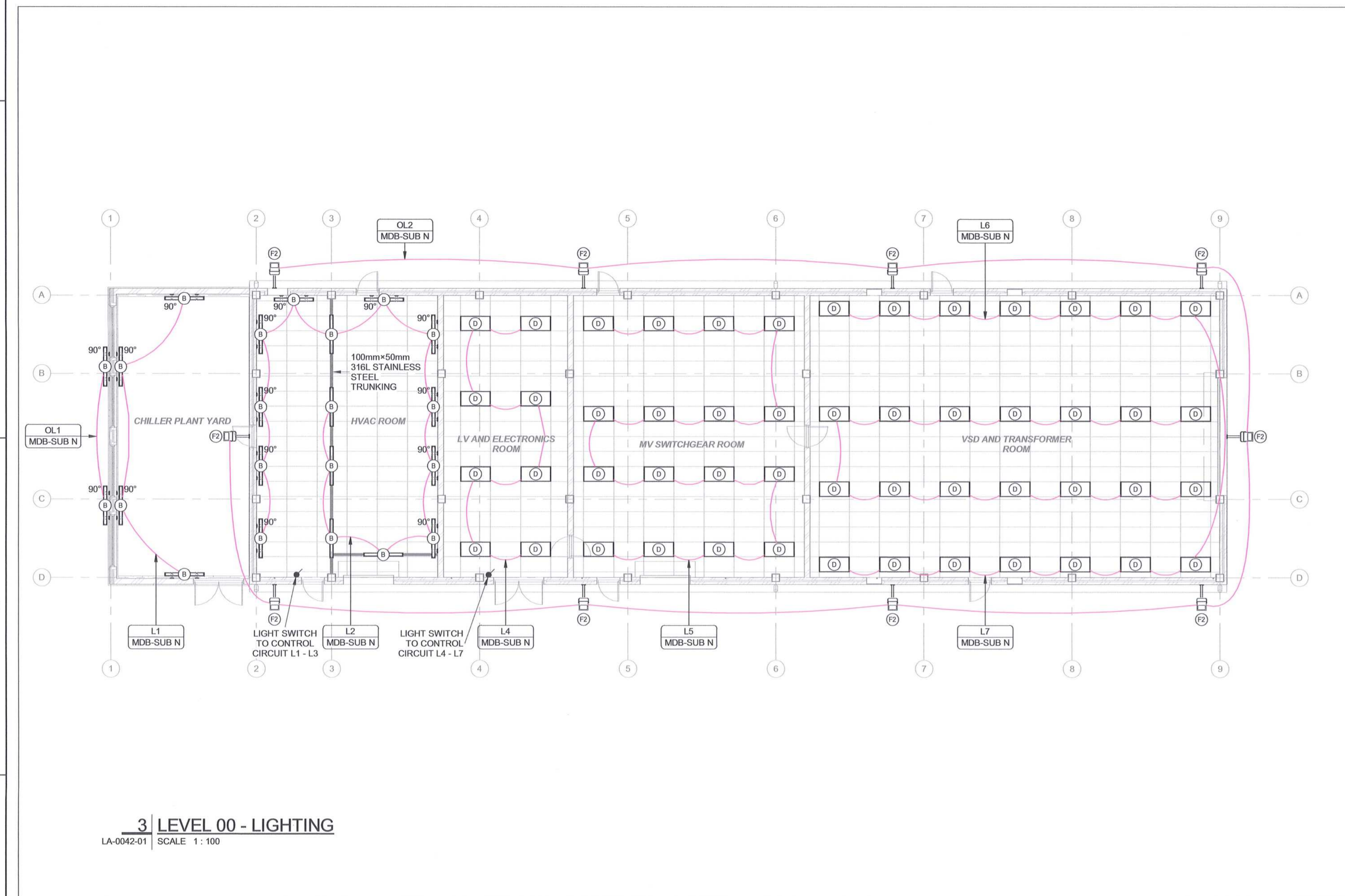
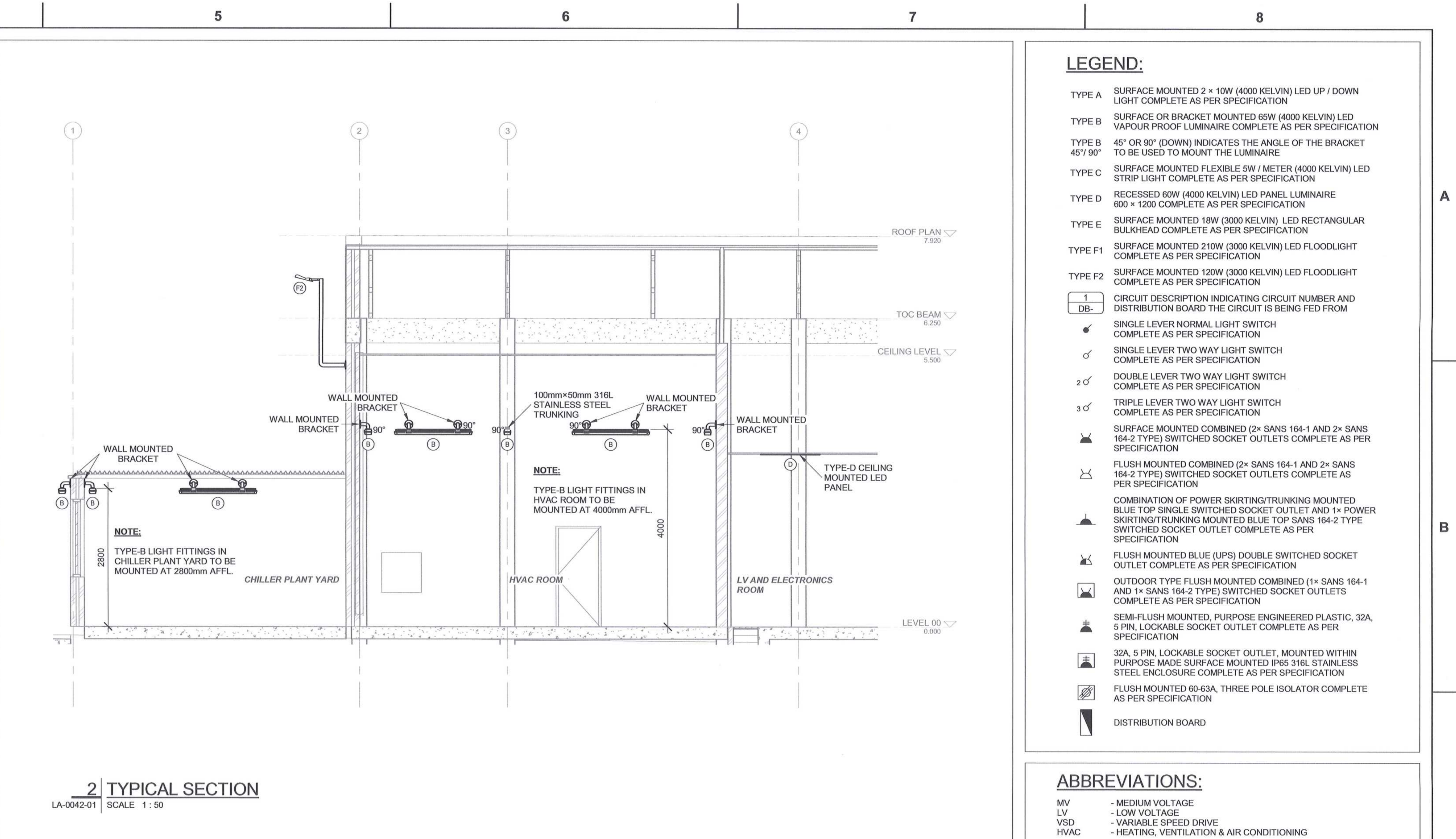
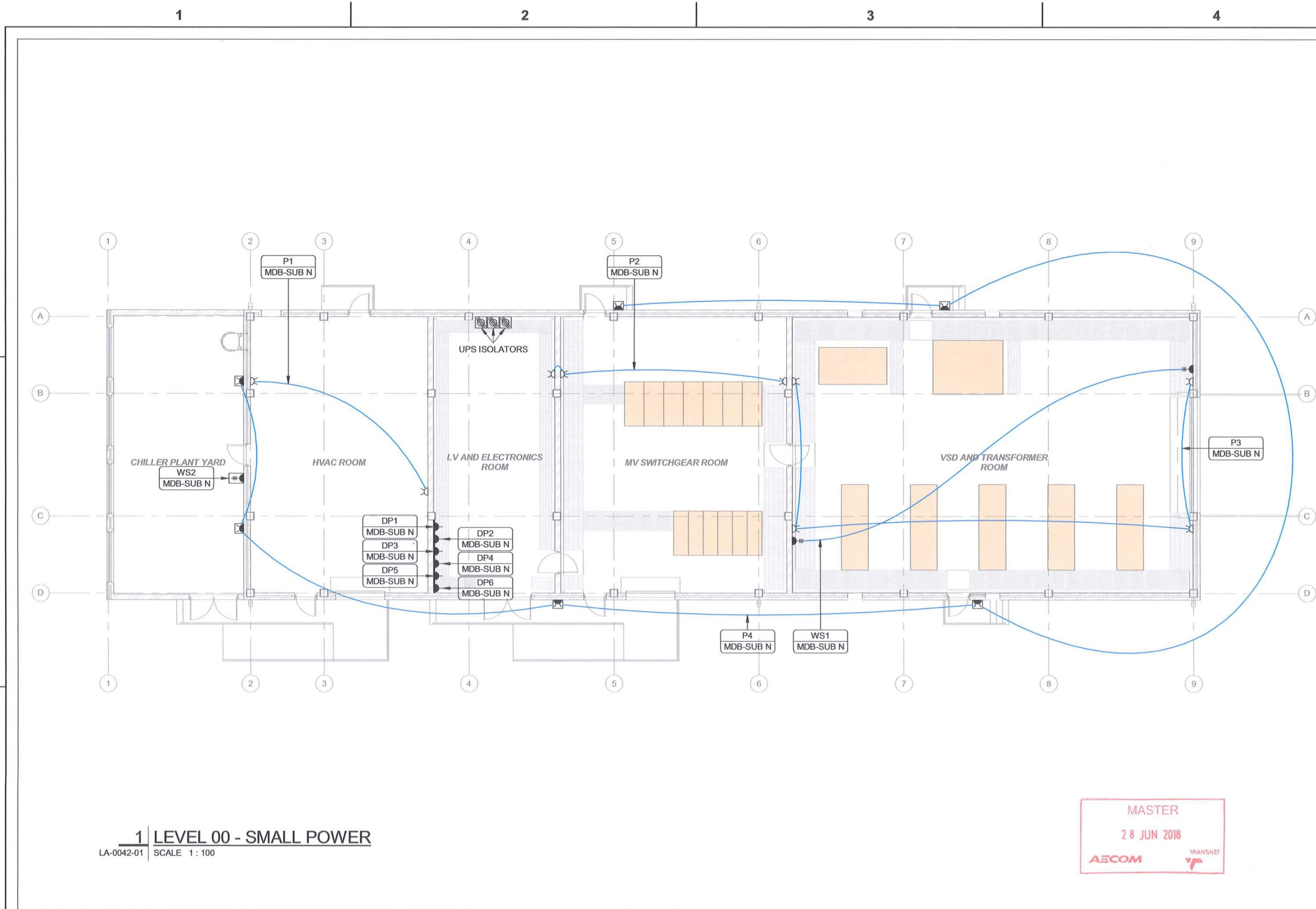
**Transnet Capital Projects**

FRANSNET LTD (CORPORATE) TRANSNET CAPITAL PROJECTS: REG. NO. 1966000000  
TABLE BAY BUILDING, TYGERBERG PARK, 180 VOR VOOR DRIVE, PLATTEKLIP, 7801  
TEL: 021 940 1999  
FAX: 021 677 2455

**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT**  
BULK POWER UPGRADE:  
SUBSTATION M  
LEVEL 00 - ELECTRONICS LAYOUT

PROJECT NUMBER	DD	FBS	DRS	TYPE	DRAWING NO.	SHEET	REV	ID
A01924701	2	3	0	E	LA	0036	01	AE



DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

- NOTES**
- DO NOT SCALE DRAWINGS - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON SITE AND NOTIFY THE REC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - FINAL POSITION OF ALL ELECTRICAL EQUIPMENT SHALL BE CONFIRMED ON SITE, IN CONJUNCTION WITH, AND APPROVAL OF, THE EMPLOYER.
  - CONTRACTOR TO NOTE THAT ALL LIGHTING IS SWITCHED VIA DB MOUNTED CONTACTORS AND SUFFICIENT CONDUITING IS TO BE ALLOWED FOR.
  - ALL ELECTRONIC SERVICES CABLING, SHALL BE DISTRIBUTED THROUGH THE BUILDING VIA SEPARATE CONDUITS AND DUCTING INFRASTRUCTURE.

**AECOM**

CAPE TOWN OFFICE  
 WATERSIDE PLACE, SOUTH GATE  
 TYGER WATERFRONT  
 CANAL CRUISE DRIVE  
 TEL: +27 (0)21 950 7500  
 FAX: +27 (0)21 950 7502  
 REG. No. 1966/006628/07

NO	ISSUED FOR CONSTRUCTION	DC	BS	CP	DATE
00	ISSUED FOR CONSTRUCTION	DC	BS	CP	2018-06-22

**REVISIONS**

NO	DESCRIPTION	BY	CHKD	APPD	DATE

This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

CONTRACTOR/CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE

**OPERATING DIVISIONS**

TITLE	NAME	SIGN	DATE

**PR.ENG./PR.TECH./PR.ARCH**

NAME	DATE

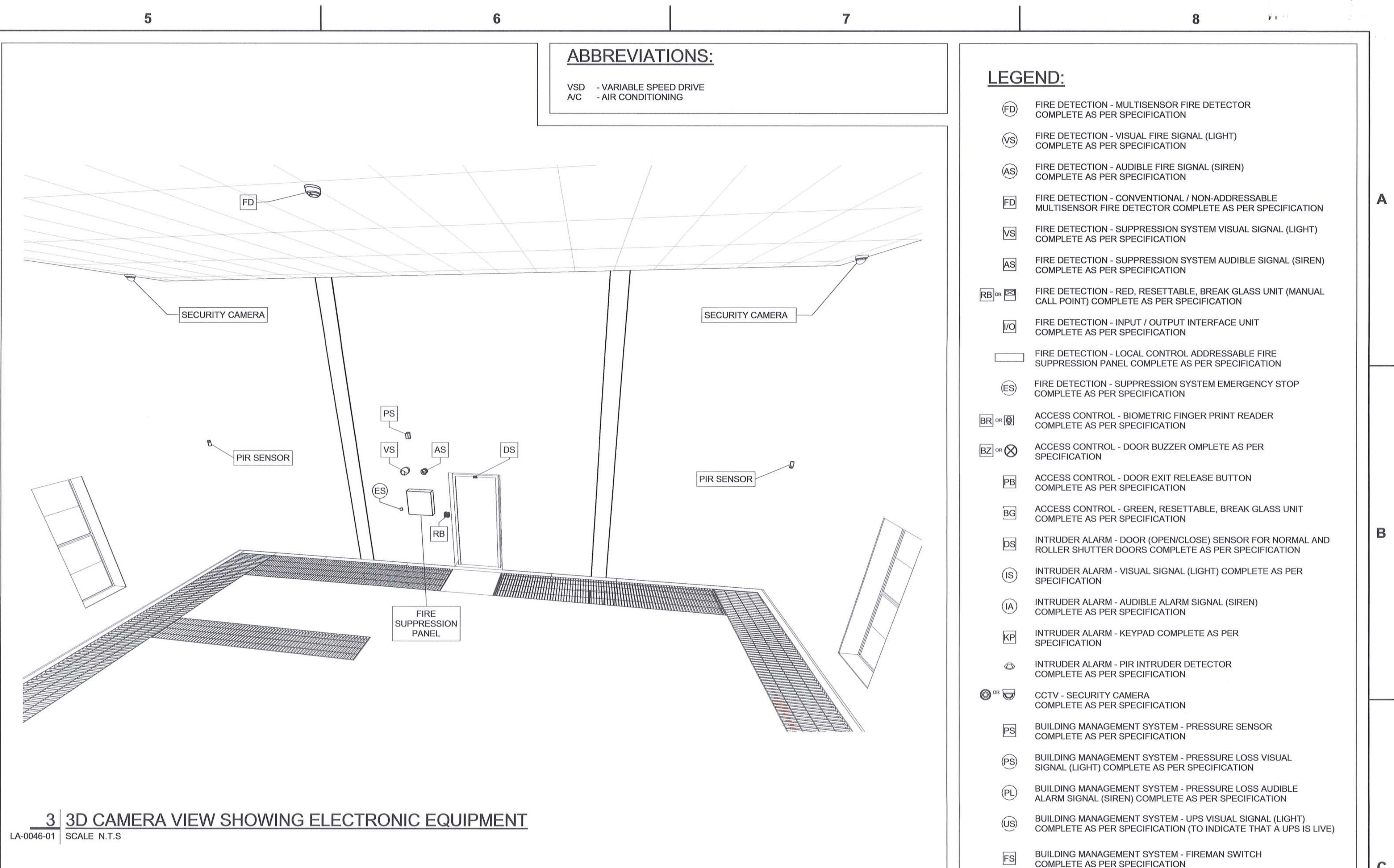
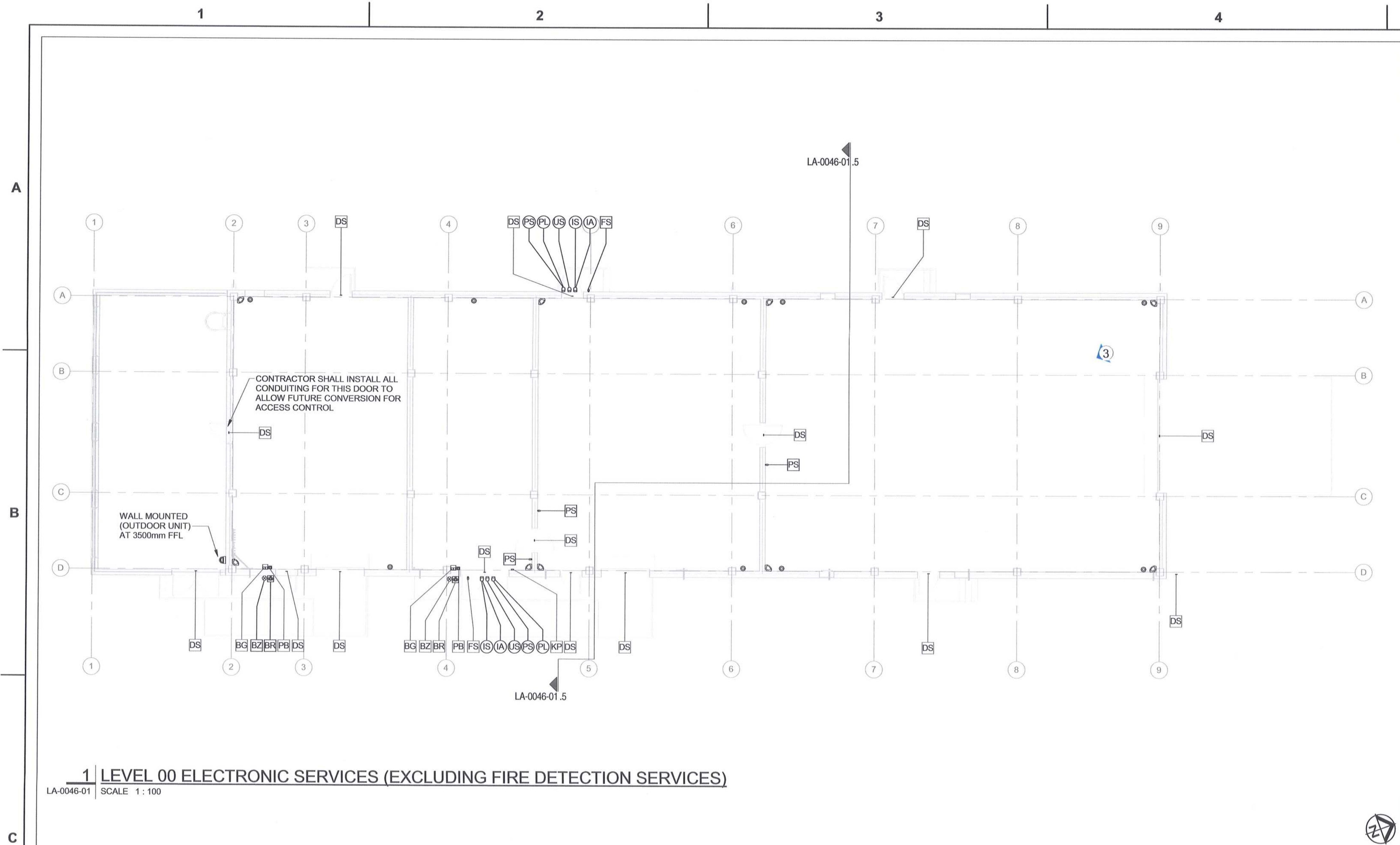
REG. NUMBER: 50270126  
 SCALE: AS SHOWN

Transnet Capital Projects  
 TABLE BAY BUILDING, TYGERSBERG PARK,  
 163 UYS BURG DRIVE, PLATTENLOEF,  
 8001  
 TEL: 021 940 9999  
 FAX: 021 947 2955

**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE:  
 SUBSTATION N  
 LEVEL 00 SMALL POWER AND LIGHTING LAYOUT**

PROJECT NUMBER	DO	FBS	DRS	TYPE	DRAWING NO.	SHEET	REV	ID
19247011	2	30	0	E	LA-0042	01	0	AE

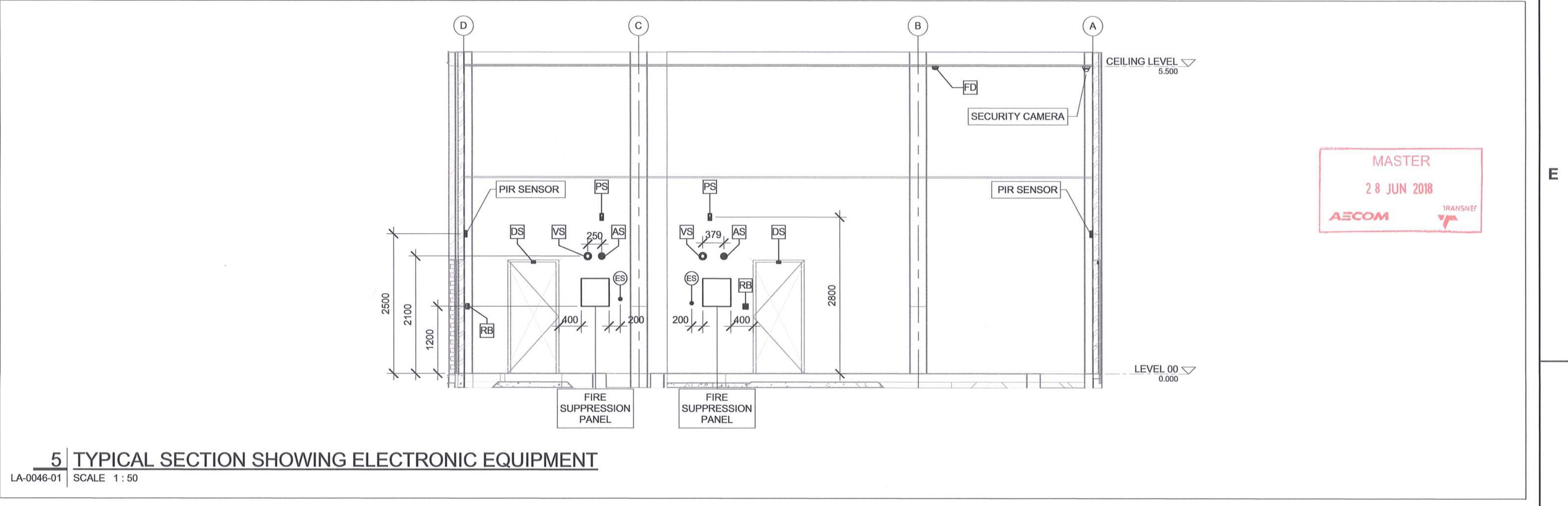
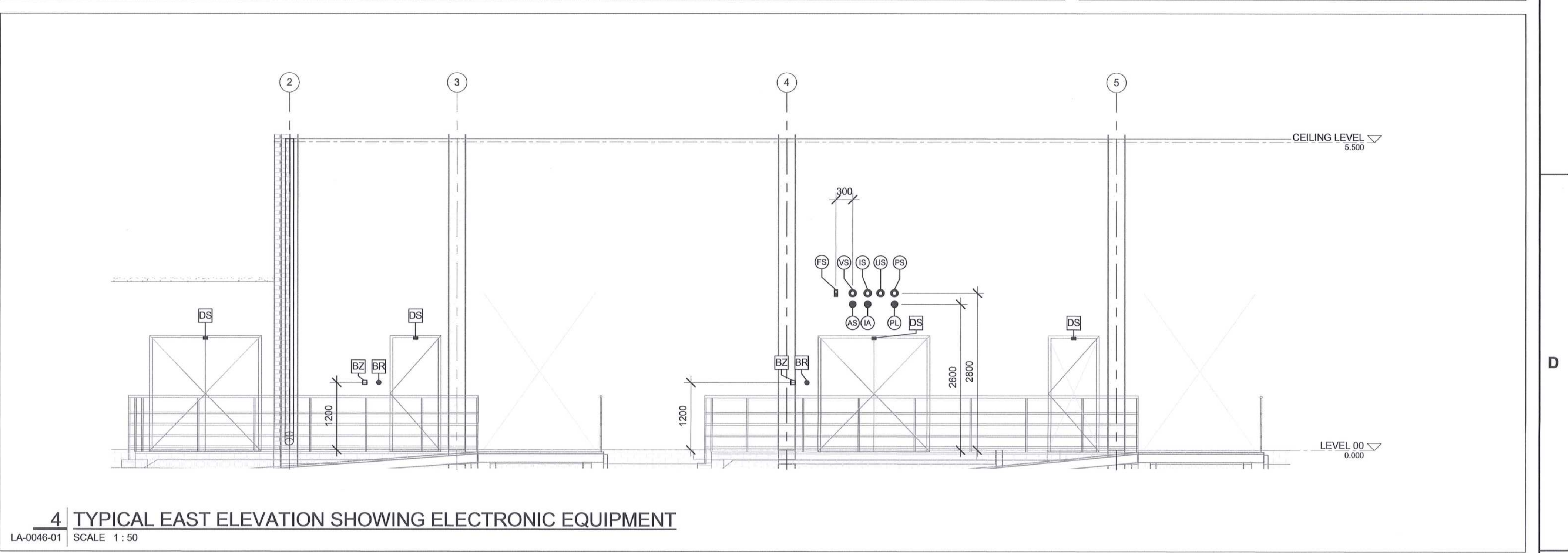
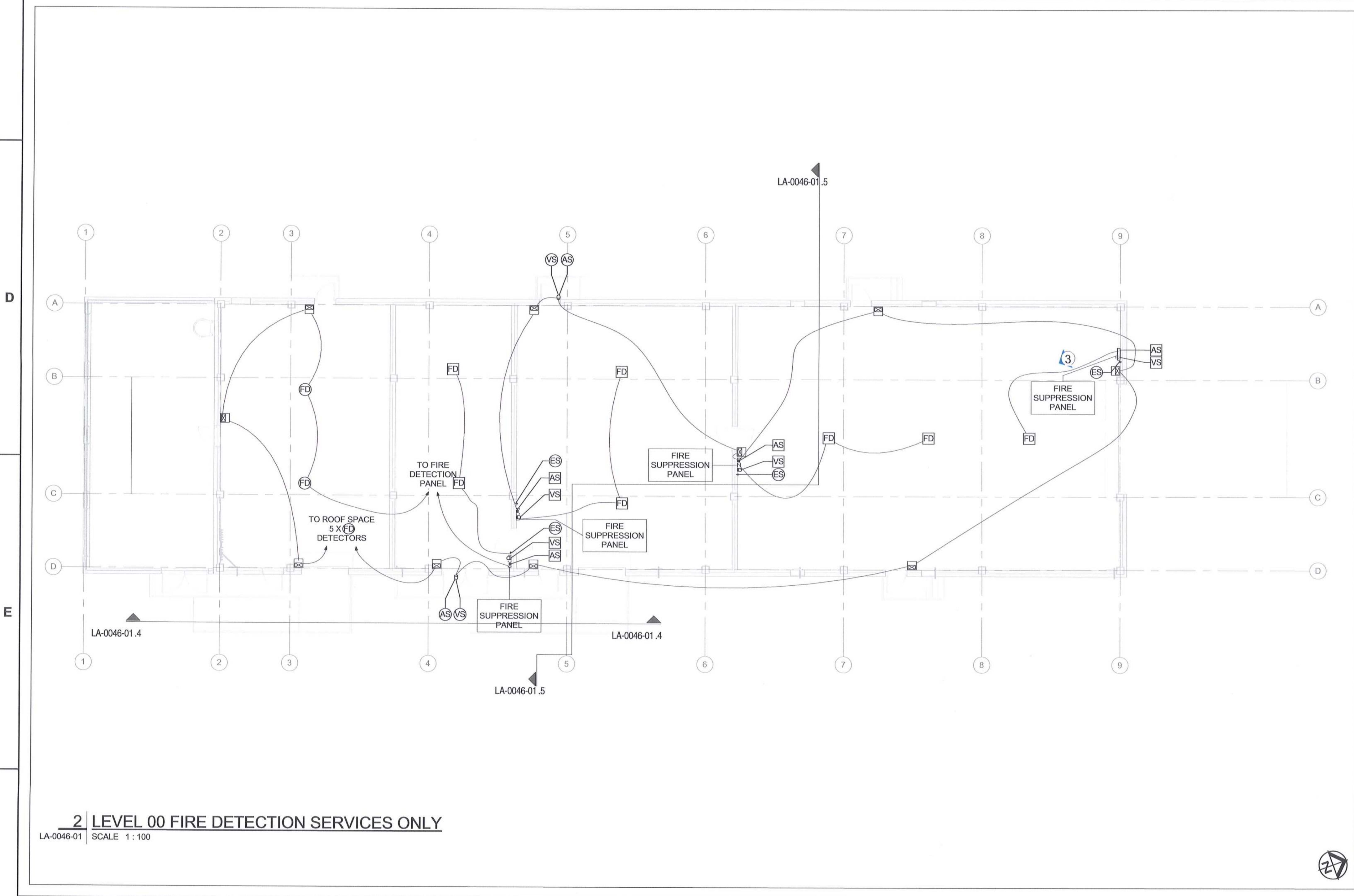


**ABBREVIATIONS:**

- VSD - VARIABLE SPEED DRIVE
- A/C - AIR CONDITIONING

**LEGEND:**

- FD - FIRE DETECTION - MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION
- VS - FIRE DETECTION - VISUAL FIRE SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- AS - FIRE DETECTION - AUDIBLE FIRE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- FD - FIRE DETECTION - CONVENTIONAL / NON-ADDRESSABLE MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION
- VS - FIRE DETECTION - SUPPRESSION SYSTEM VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- AS - FIRE DETECTION - SUPPRESSION SYSTEM AUDIBLE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- FD - FIRE DETECTION - RED, RESETTABLE, BREAK GLASS UNIT (MANUAL CALL POINT) COMPLETE AS PER SPECIFICATION
- IC - FIRE DETECTION - INPUT / OUTPUT INTERFACE UNIT COMPLETE AS PER SPECIFICATION
- FD - FIRE DETECTION - LOCAL CONTROL ADDRESSABLE FIRE SUPPRESSION PANEL COMPLETE AS PER SPECIFICATION
- ES - FIRE DETECTION - SUPPRESSION SYSTEM EMERGENCY STOP COMPLETE AS PER SPECIFICATION
- IR - ACCESS CONTROL - BIOMETRIC FINGER PRINT READER COMPLETE AS PER SPECIFICATION
- BZ - ACCESS CONTROL - DOOR BUZZER COMPLETE AS PER SPECIFICATION
- FR - ACCESS CONTROL - DOOR EXIT RELEASE BUTTON COMPLETE AS PER SPECIFICATION
- GC - ACCESS CONTROL - GREEN, RESETTABLE, BREAK GLASS UNIT COMPLETE AS PER SPECIFICATION
- DS - INTRUDER ALARM - DOOR (OPEN/LOSE) SENSOR FOR NORMAL AND ROLLER SHUTTER DOORS COMPLETE AS PER SPECIFICATION
- IS - INTRUDER ALARM - VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- AS - INTRUDER ALARM - AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- KP - INTRUDER ALARM - KEYPAD COMPLETE AS PER SPECIFICATION
- PIR - INTRUDER ALARM - PIR INTRUDER DETECTOR COMPLETE AS PER SPECIFICATION
- CCTV - SECURITY CAMERA COMPLETE AS PER SPECIFICATION
- PS - BUILDING MANAGEMENT SYSTEM - PRESSURE SENSOR COMPLETE AS PER SPECIFICATION
- PL - BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- AL - BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- US - BUILDING MANAGEMENT SYSTEM - UPS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION (TO INDICATE THAT A UPS IS LIVE)
- FS - BUILDING MANAGEMENT SYSTEM - FIREMAN SWITCH COMPLETE AS PER SPECIFICATION



DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

- NOTES**
- DO NOT SCALE DRAWINGS - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - FINAL DESIGNS TO BE UNDERTAKEN BY SPECIALIST CONTRACTOR(S)OEM(S).
  - FINAL POSITION OF ALL ELECTRONIC EQUIPMENT SHALL BE CONFIRMED ON SITE, IN CONJUNCTION WITH, AND APPROVAL OF, THE EMPLOYER.

5. ALL ELECTRICAL SERVICES CABLING, SHALL BE DISTRIBUTED THROUGH THE BUILDING VIA SEPARATE CONDUITS AND DUCTING INFRASTRUCTURE.

AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:

- ICT
- CCTV
- ACCESS CONTROL
- INTRUDER ALARM
- UPS
- OTHER ASSOCIATED SYSTEMS
- RESPECTIVE EQUIPMENT DETAILS SUPPLIED BY CONVEYOR CONTRACTOR
- FIRE DETECTION
- ALL LABELLING OF EQUIPMENT INCLUDING EXTERNAL INDICATION LIGHTS SIGNAGE.



CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966000028/07

NO	ISSUED FOR CONSTRUCTION	DESCRIPTION	BY	CHKD	APPD	DATE
00						2018-05-28

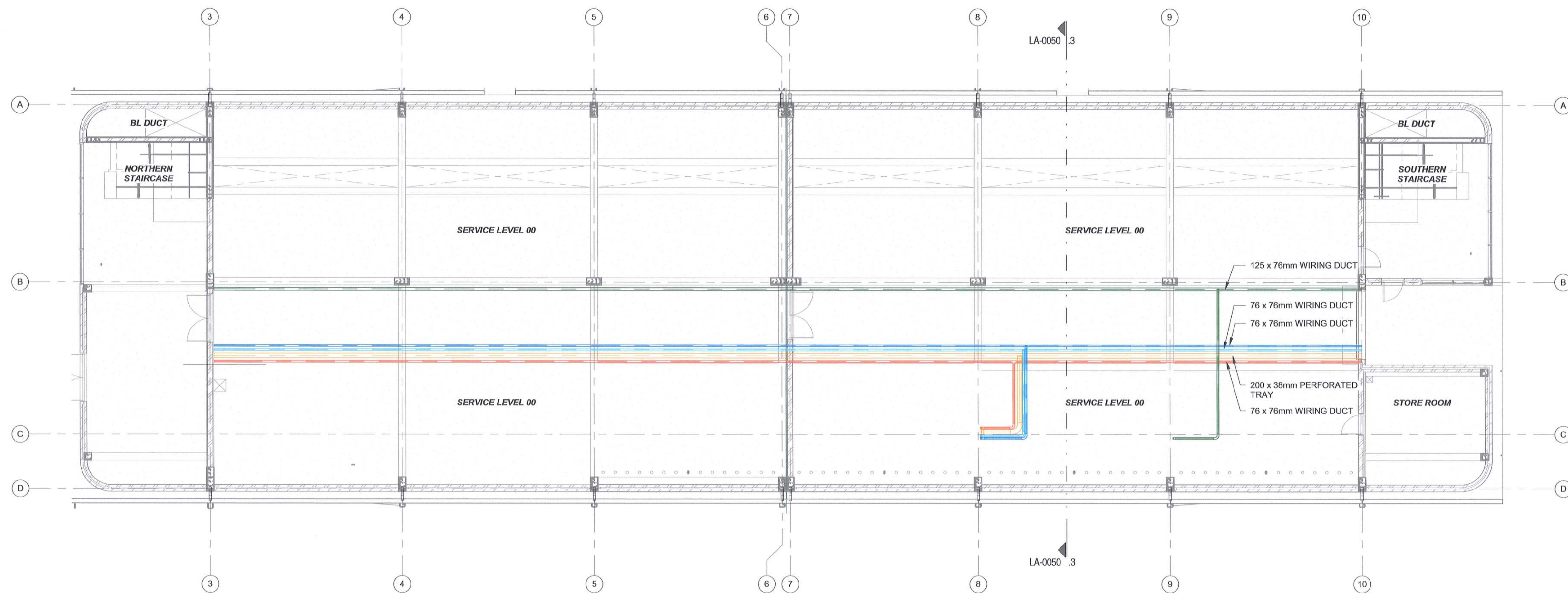
CONTRACTOR/CONSULTANT				FRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	DD		18 05 28
				CHECKED	MA		18 05 28
				DESIGNED	LK		18 05 28
				CHECKED	ES		18 05 28

Transnet Capital Projects  
TRANSNET  
TABLE BAY BUILDING, TYGERBERG PARK  
160 VVO BRIDGE DRIVE, PLATTEKLOOF  
TEL: 021 945 1999  
FAX: 021 677 2455

**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE:  
SUBSTATION N  
LEVEL 00 ELECTRONICS LAYOUT**

PROJECT NUMBER: 19247012  
FBS: 300  
DIS: E  
TYPE: LA  
DRAWING NO: 0046  
SHEET: 01  
REV: 00  
ID: AE



**1 | 00 LEVEL - CABLE MANAGEMENT SYSTEM**  
LA-0050 | SCALE: 1:100

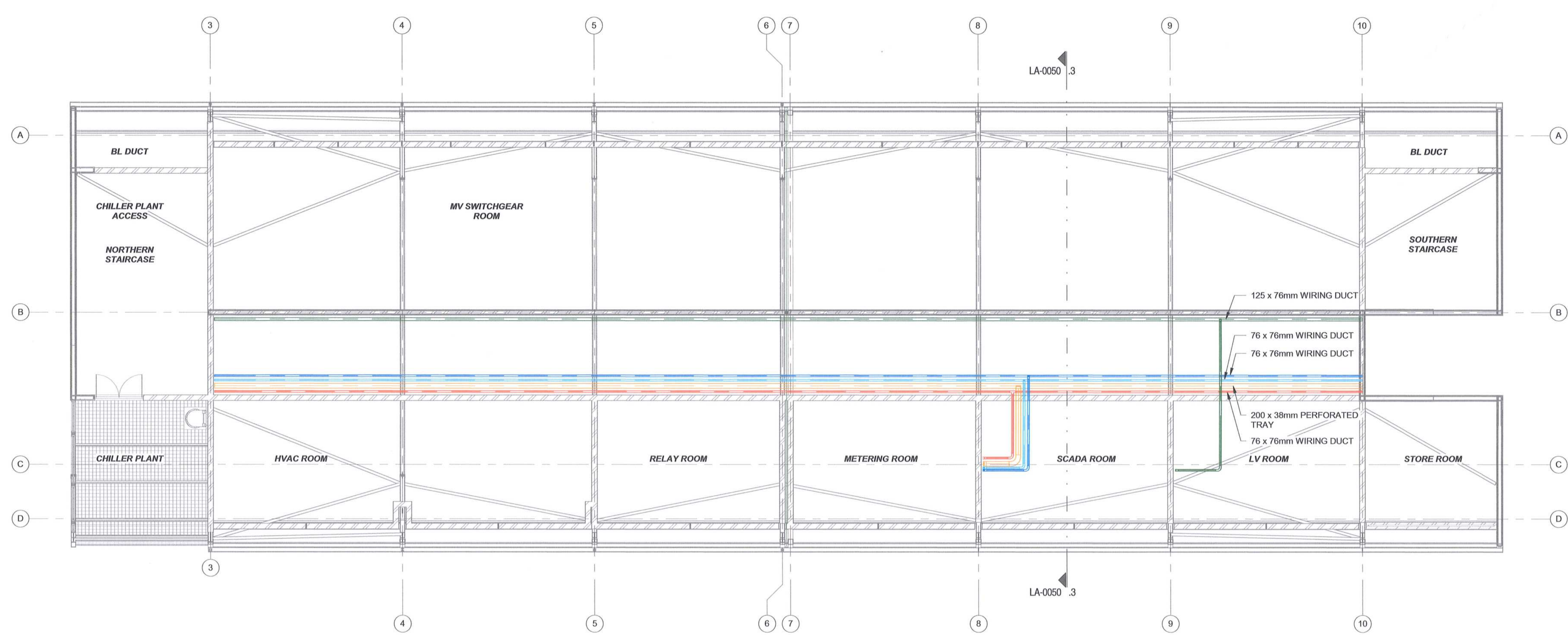
**LEGEND:**

- 125 X 76mm WIRING DUCT (BACKBONE FOR LV CONDUCTORS)
- 76 X 76mm WIRING DUCT (BACKBONE FOR FIRE DETECTION CABLING / WIRING)
- 200 X 38mm PERFORATED TRAY (BACKBONE FOR CCTV CABLING / WIRING)
- 76 X 76mm WIRING DUCT (BACKBONE FOR ACCESS CONTROL CABLING / WIRING)
- 76 X 76mm WIRING DUCT (BACKBONE FOR INTRUDER ALARM CABLING / WIRING)

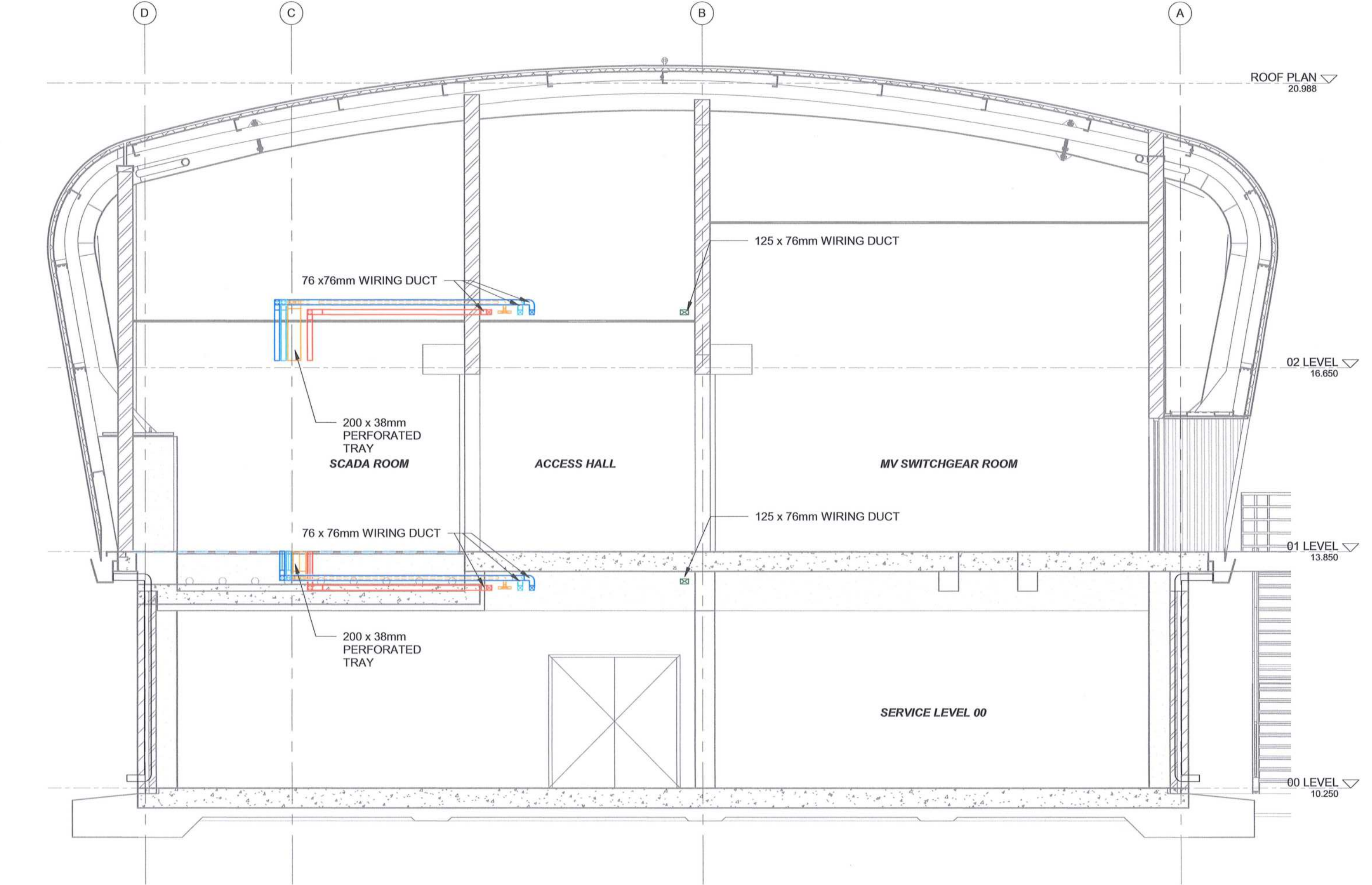
**ABBREVIATIONS:**

- BL - BLAST
- LV - LOW VOLTAGE
- MV - MEDIUM VOLTAGE
- SCADA - SUPERVISORY CONTROL AND DATA ACQUISITION
- HVAC - HEATING VENTILATION AND AIR CONDITIONING

MASTER  
 28 JUN 2018



**2 | 02 LEVEL - CABLE MANAGEMENT SYSTEM**  
LA-0050 | SCALE: 1:100



**3 | TYPICAL SECTION SHOWING CABLE MANAGEMENT SYSTEM**  
LA-0050 | SCALE: 1:50

**NOTES**

1. DO NOT SCALE DRAWINGS - ONLY DIMENSIONS SHOWN TO BE USED.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
3. CABLE MANAGEMENT SYSTEMS AND POSITIONS ARE PROPOSED AND FOR ILLUSTRATIVE PURPOSES ONLY.
4. FINAL CABLE MANAGEMENT SYSTEMS, POSITIONS AND ROUTES AND THE LIKE TO BE FINALISED ON SITE IN CONJUNCTION WITH EMPLOYER.

**AECOM**

CAPE TOWN OFFICE  
 WATERSIDE PLACE, SOUTH GATE  
 TYGER WATERFRONT  
 CARL CRONJE DRIVE

TEL: +27 (0)21 950 7500  
 FAX: +27 (0)21 950 7502  
 REG. No. 1966000628707

CONTRACTOR/CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	DD		18 06 25
				CHECKED	DC		18 06 25
				DESIGNED	LK		18 06 25
				CHECKED	BS		18 06 25
OPERATING DIVISIONS				PR.ENG./PR.TECH./PR.ARCH			
TITLE	NAME	SIGN	DATE	NAME	SIGN	DATE	DATE
00	ISSUED FOR CONSTRUCTION	DD	BS	CP	2018-06-25		
NO	DESCRIPTION	BY	CHKD	APPD	DATE		
REVISIONS							

Transnet Capital Projects  
 TABLE BAY BUILDING, TYGERBERG PARK,  
 162 WYB RIDGE DRIVE, PLATTENKLOOF,  
 0001

TEL: 021 946 1999  
 FAX: 021 946 2455

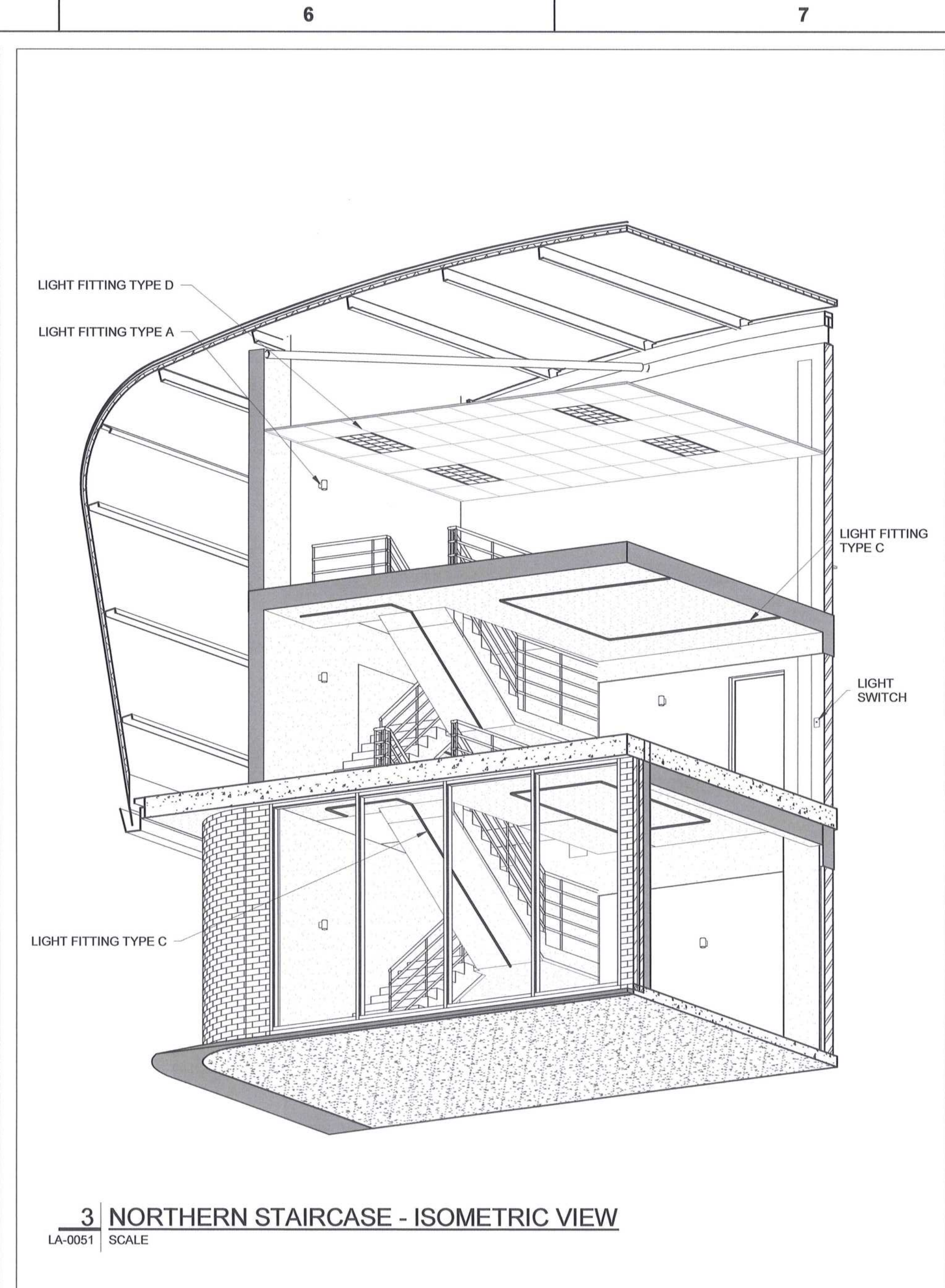
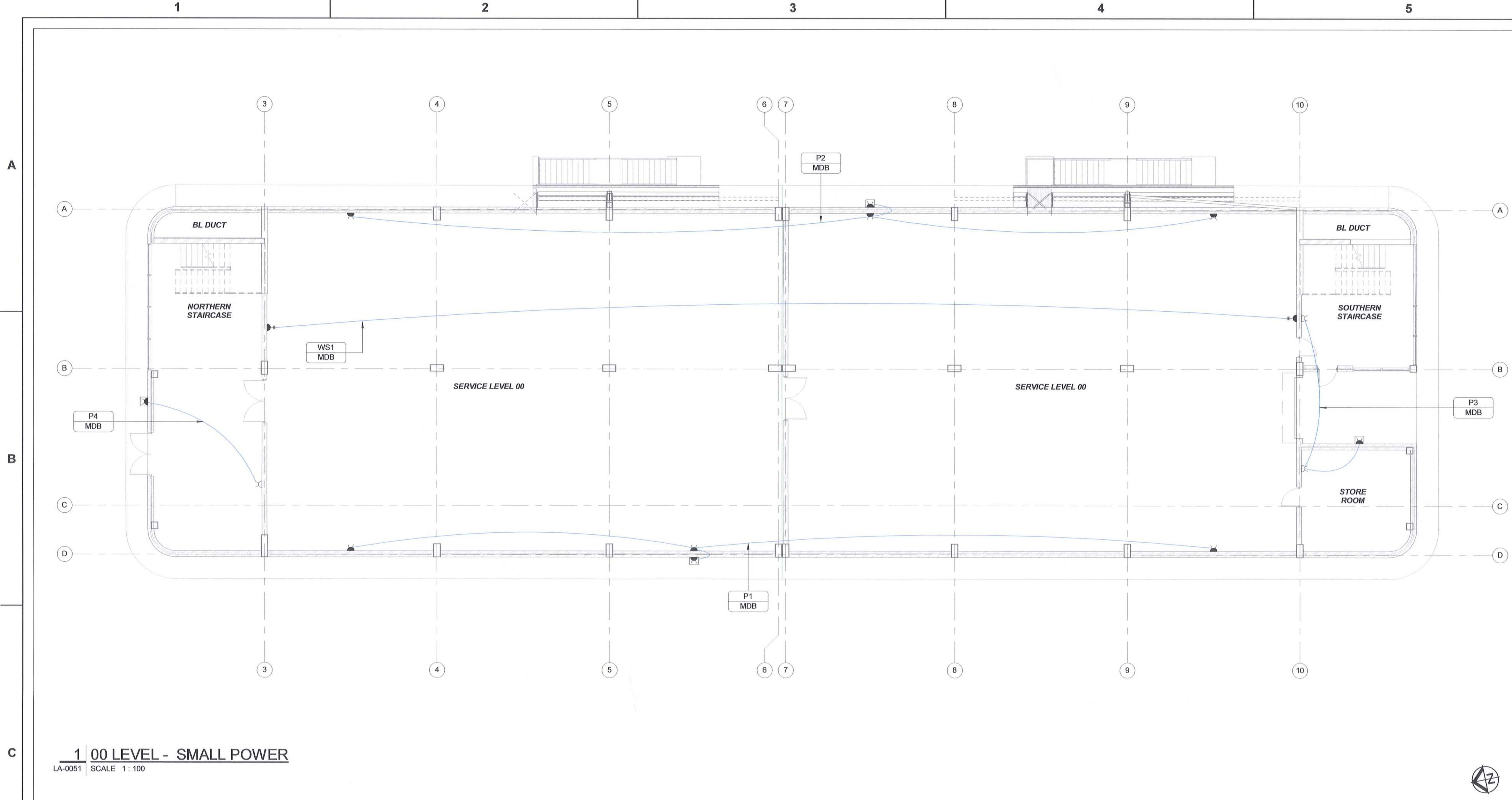
**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT  
 BULK POWER UPGRADE:  
 NEW MAIN INTAKE SUBSTATION  
 LEVELS 00 AND ROOF - CABLE MANAGEMENT SYSTEM**

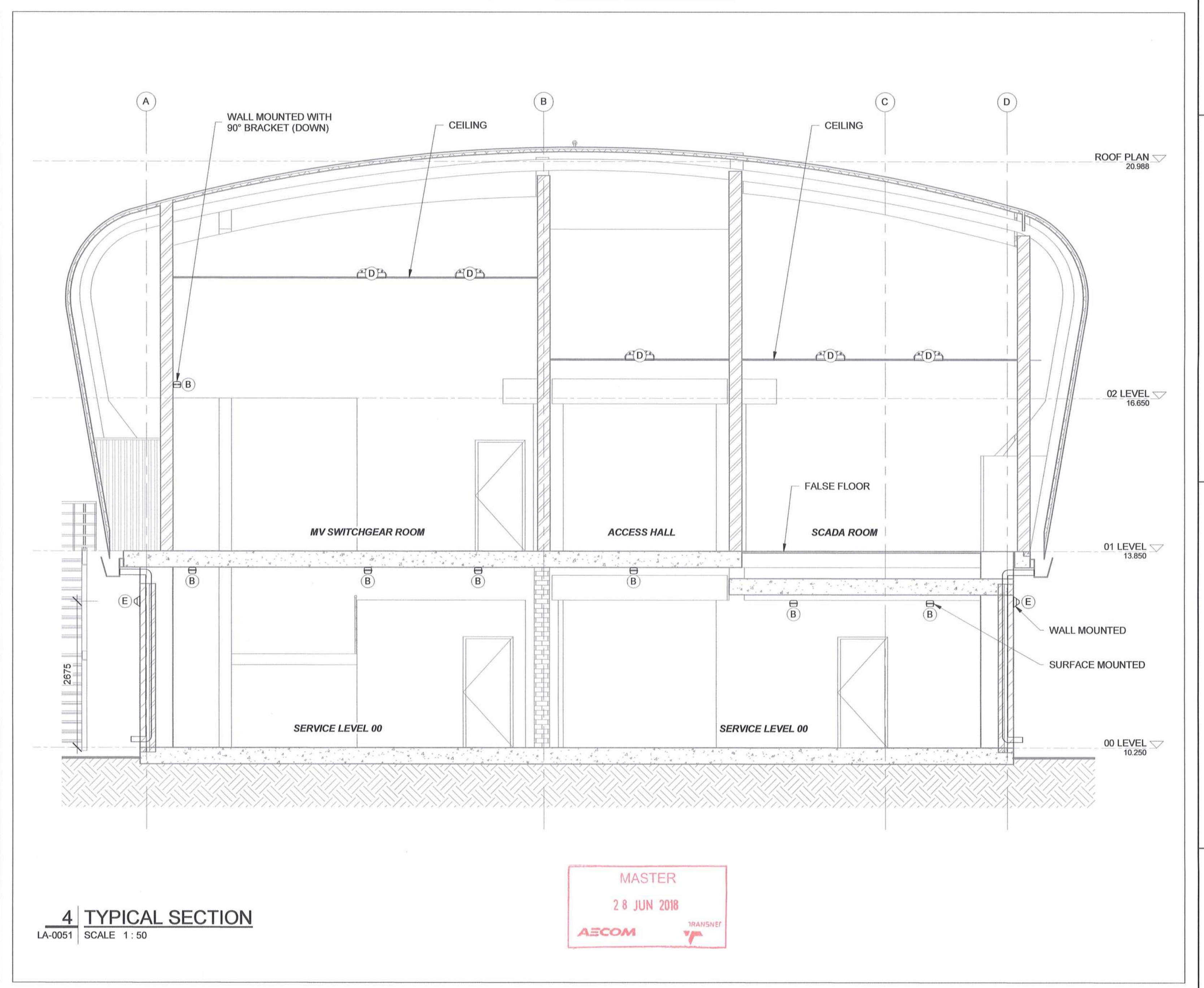
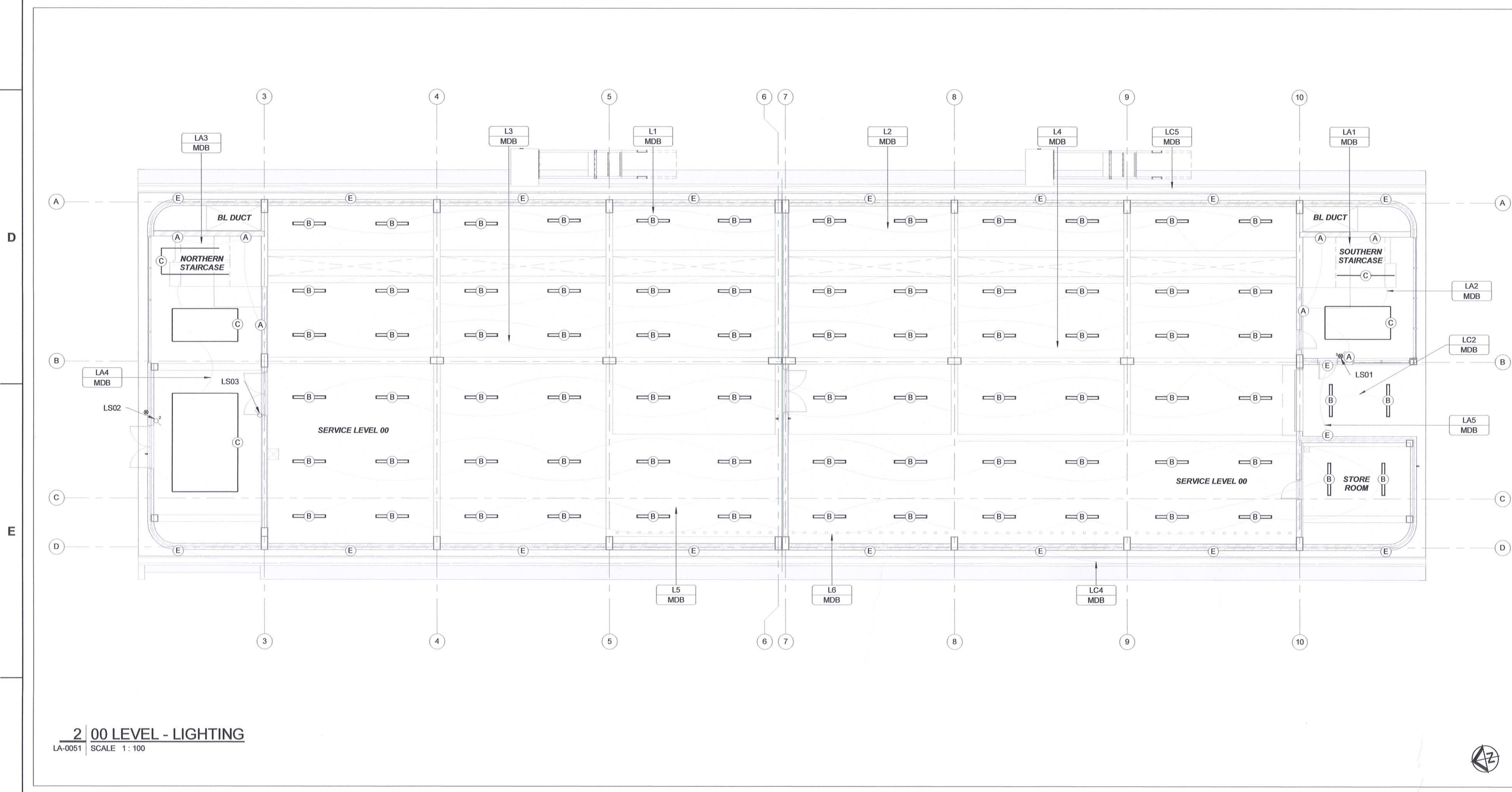
PROJECT NUMBER	DD	FBS	DIS	TYPE	DRAWING NO	SHEET	REV	ID
A010247012	3	0	0	E	LA 0050	01	00	AE

DRAWING NO.	REFERENCE
1	
2	
3	
4	
5	





- LEGEND:**
- TYPE A SURFACE MOUNTED 2 x 10W (4000 KELVIN) LED UP / DOWN LIGHT COMPLETE AS PER SPECIFICATION
  - TYPE B SURFACE OR BRACKET MOUNTED 60W (4000 KELVIN) LED VAPOUR PROOF LUMINAIRE COMPLETE AS PER SPECIFICATION
  - TYPE C 45° OR 90° (DOWN) INDICATES THE ANGLE OF THE BRACKET TO BE USED TO MOUNT THE LUMINAIRE
  - TYPE D SURFACE MOUNTED FLEXIBLE 5W / METER (4000 KELVIN) LED STRIP LIGHT COMPLETE AS PER SPECIFICATION
  - TYPE E RECESSED 60W (4000 KELVIN) LED PANEL LUMINAIRE 600 x 1200 COMPLETE AS PER SPECIFICATION
  - TYPE F1 SURFACE MOUNTED 18W (3000 KELVIN) LED RECTANGULAR BULKHEAD COMPLETE AS PER SPECIFICATION
  - TYPE F2 SURFACE MOUNTED 210W (3000 KELVIN) LED FLOODLIGHT COMPLETE AS PER SPECIFICATION
  - TYPE F3 SURFACE MOUNTED 120W (3000 KELVIN) LED FLOODLIGHT COMPLETE AS PER SPECIFICATION
- 1 DB:** CIRCUIT DESCRIPTION INDICATING CIRCUIT NUMBER AND DISTRIBUTION BOARD THE CIRCUIT IS BEING FED FROM
- 1 SINGLE LEVER NORMAL LIGHT SWITCH COMPLETE AS PER SPECIFICATION
  - 2 SINGLE LEVER TWO WAY LIGHT SWITCH COMPLETE AS PER SPECIFICATION
  - 3 DOUBLE LEVER TWO WAY LIGHT SWITCH COMPLETE AS PER SPECIFICATION
  - 4 TRIPLE LEVER TWO WAY LIGHT SWITCH COMPLETE AS PER SPECIFICATION
  - 5 SURFACE MOUNTED COMBINED (2x SANS 164-1 AND 2x SANS 164-2 TYPE) SWITCHED SOCKET OUTLETS COMPLETE AS PER SPECIFICATION
  - 6 FLUSH MOUNTED COMBINED (2x SANS 164-1 AND 2x SANS 164-2 TYPE) SWITCHED SOCKET OUTLETS COMPLETE AS PER SPECIFICATION
  - 7 COMBINATION OF POWER SKIRTING/TRUNKING MOUNTED BLUE TOP SINGLE SWITCHED SOCKET OUTLET AND 1x POWER SKIRTING/TRUNKING MOUNTED BLUE TOP SANS 164-2 TYPE SWITCHED SOCKET OUTLET COMPLETE AS PER SPECIFICATION
  - 8 FLUSH MOUNTED BLUE (UPS) DOUBLE SWITCHED SOCKET OUTLET COMPLETE AS PER SPECIFICATION
  - 9 OUTDOOR TYPE FLUSH MOUNTED COMBINED (1x SANS 164-1 AND 1x SANS 164-2 TYPE) SWITCHED SOCKET OUTLETS COMPLETE AS PER SPECIFICATION
  - 10 SEMI-FLUSH MOUNTED, PURPOSE ENGINEERED PLASTIC, 32A, 5 PIN, LOCKABLE SOCKET OUTLET COMPLETE AS PER SPECIFICATION
  - 11 32A, 5 PIN, LOCKABLE SOCKET OUTLET, MOUNTED WITHIN PURPOSE MADE SURFACE MOUNTED IP65 316L STAINLESS STEEL ENCLOSURE COMPLETE AS PER SPECIFICATION
  - 12 FLUSH MOUNTED 60-63A, THREE POLE ISOLATOR COMPLETE AS PER SPECIFICATION
  - 13 DISTRIBUTION BOARD
- ABBREVIATIONS:**
- BL - BLAST
  - MV - MEDIUM VOLTAGE
  - LV - LOW VOLTAGE
  - VSD - VARIABLE SPEED DRIVE
  - HVAC - HEATING, VENTILATION & AIR CONDITIONING



**NOTES**

- DO NOT SCALE DRAWINGS - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- FINAL POSITION OF ALL ELECTRICAL EQUIPMENT SHALL BE CONFIRMED ON SITE, IN CONJUNCTION WITH, AND APPROVAL OF, THE EMPLOYER.
- CONTRACTOR TO NOTE THAT ALL LIGHTING IS SWITCHED VIA DB MOUNTED CONTACTORS AND SUFFICIENT CONDUITING IS TO BE ALLOWED FOR.

5. ALL ELECTRONIC SERVICES CABLING, SHALL BE DISTRIBUTED THROUGH THE BUILDING VIA SEPARATE CONDUITS AND DUCTING INFRASTRUCTURE.

AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWINGS:

- OFFERED LUMINAIRES PHOTOMETRICS AND DATA
- RESPECTIVE MV, LV, ELECTRONICS AND HVAC EQUIPMENT TO FINALISE POSITIONS OF LUMINAIRES, SOCKET OUTLETS, ISOLATORS AND THE LIKE
- L-BRACKETS FOR FIXING OF EXTERNAL FLOODLIGHTS

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

NO.	ISSUED FOR CONSTRUCTION	DD	BS	CP	DATE
00	ISSUED FOR CONSTRUCTION	DD	BS	CP	2018-06-28

**REVISIONS**

This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE

TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1968/00628/07

TITLE	NAME	SHGN	DATE
CONTRACTOR/CONSULTANT			
OPERATING DIVISIONS			
PR. ENG./PR. TECH./PR. ARCH			

**CONTRACTOR/CONSULTANT**

TITLE	NAME	SHGN	DATE
CONTRACTOR/CONSULTANT			

**TRANSNET CAPITAL PROJECTS**

TITLE	NAME	SHGN	DATE
DRAWN	DC		18 05 28
CHECKED	DC		18 05 28
DESIGNED	LK		28 05 28
CHECKED	BS		18 05 28

**TRANSNET CAPITAL PROJECTS**

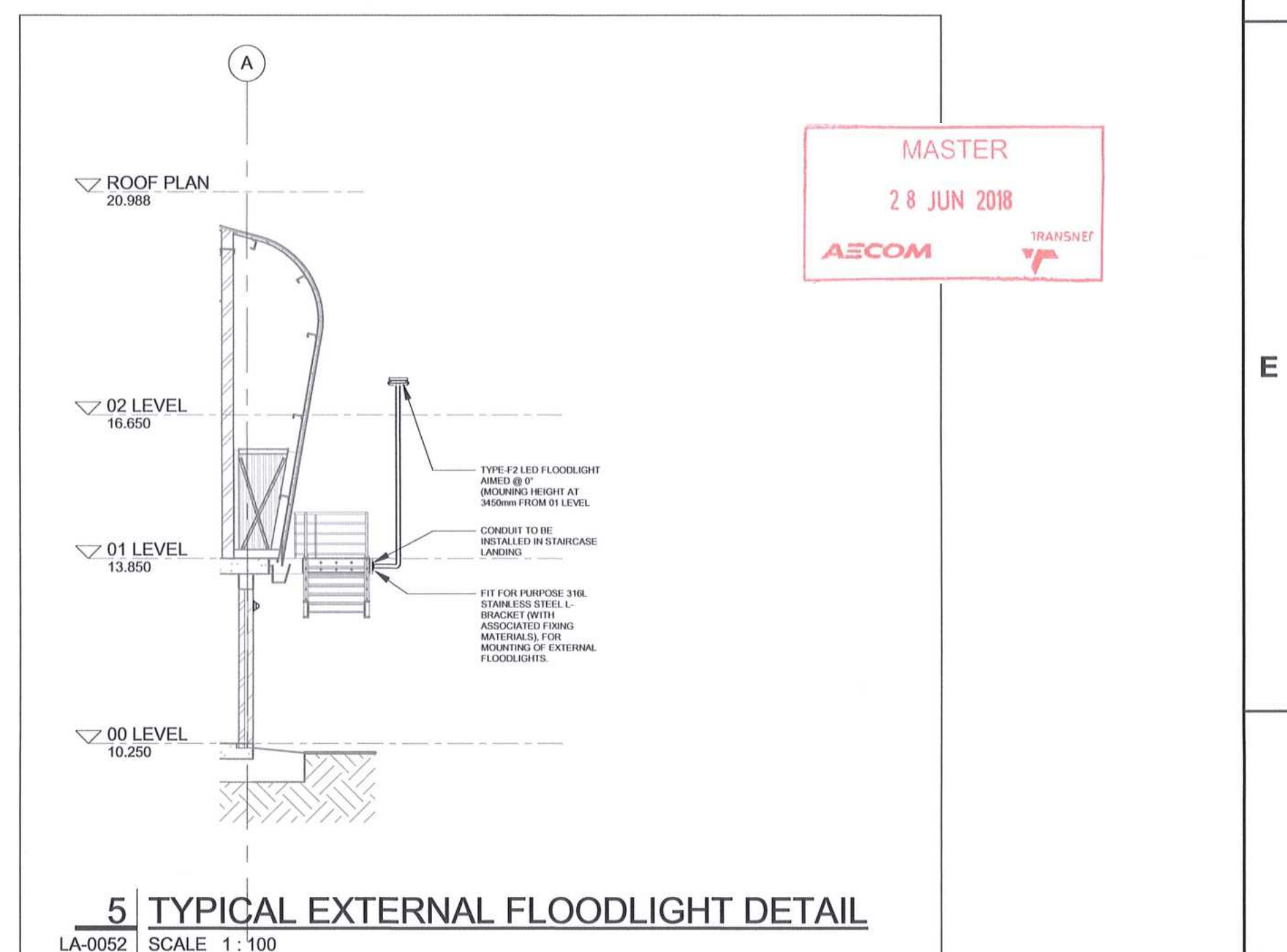
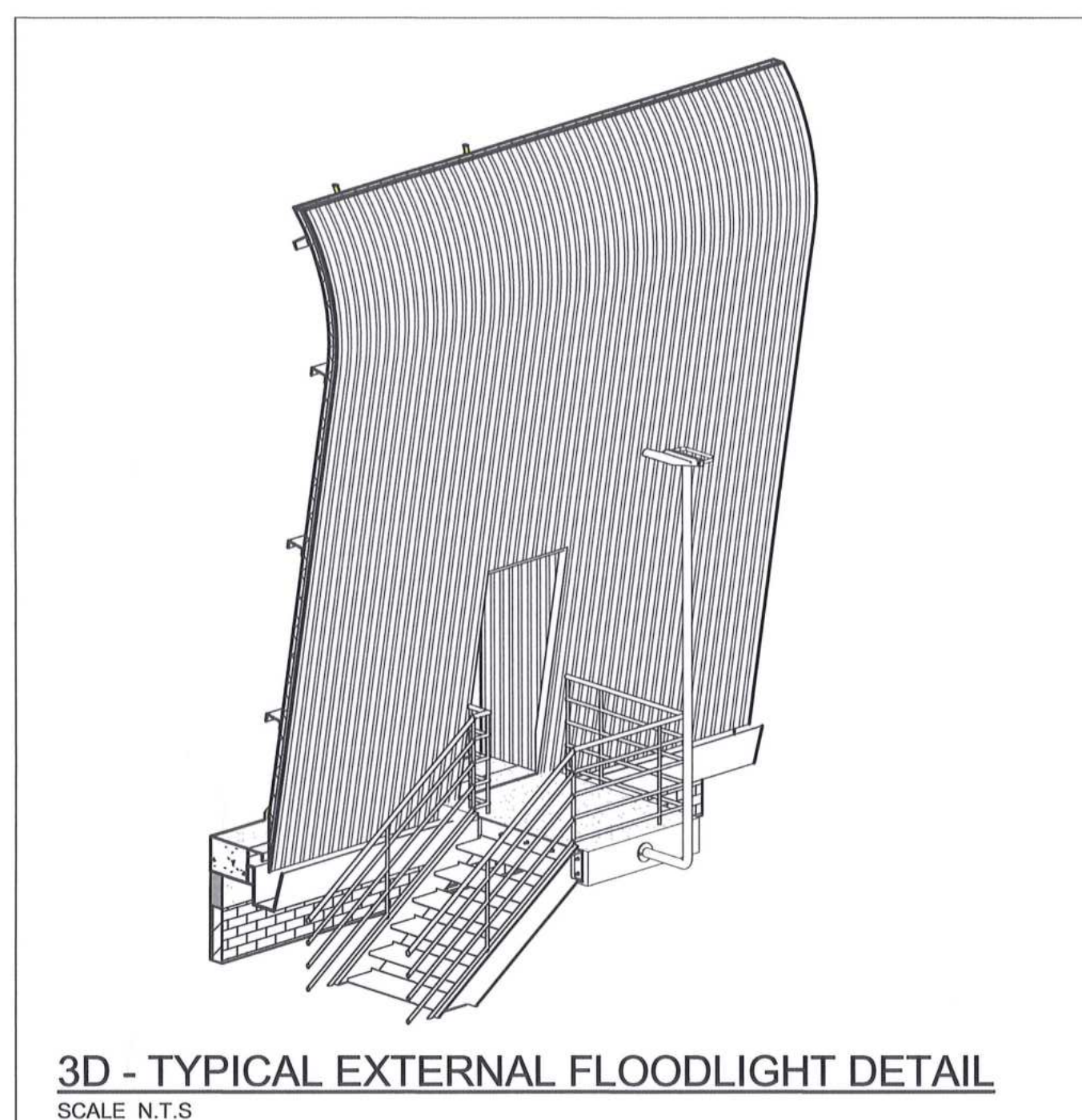
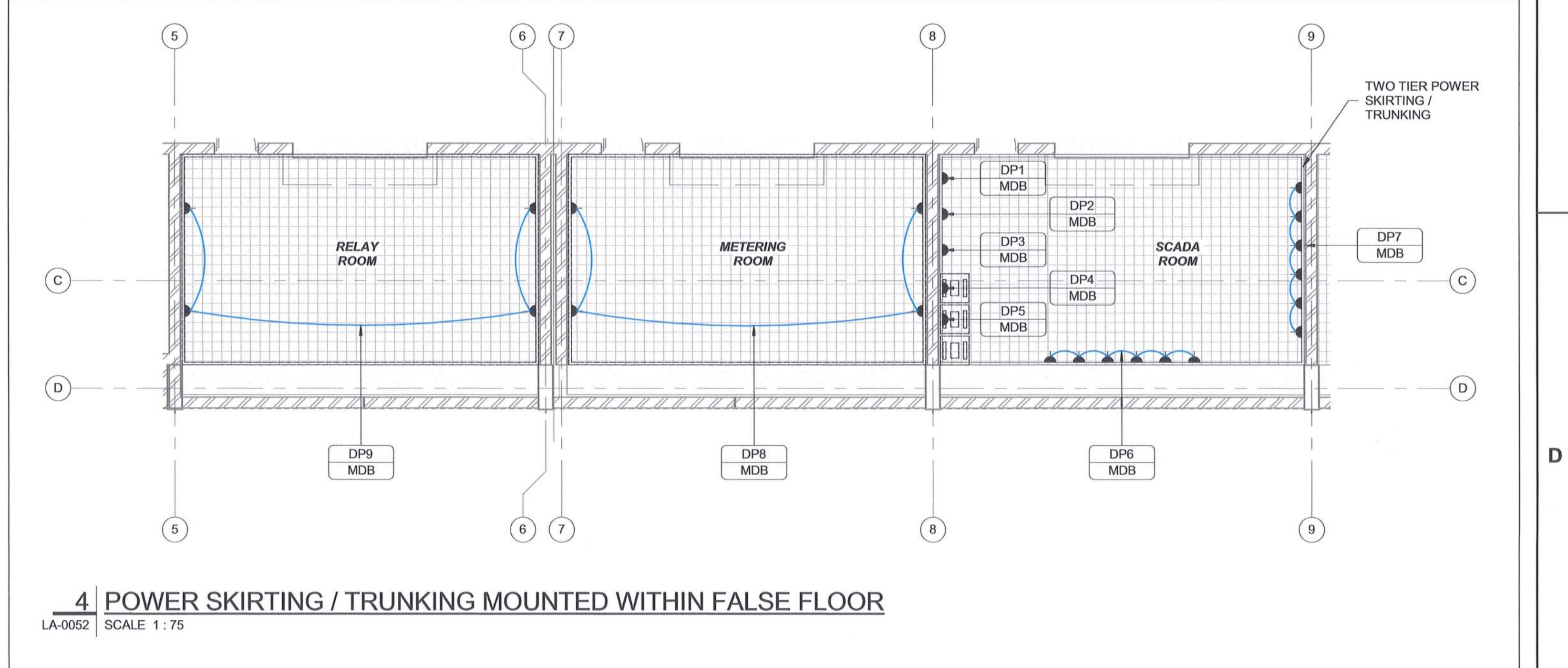
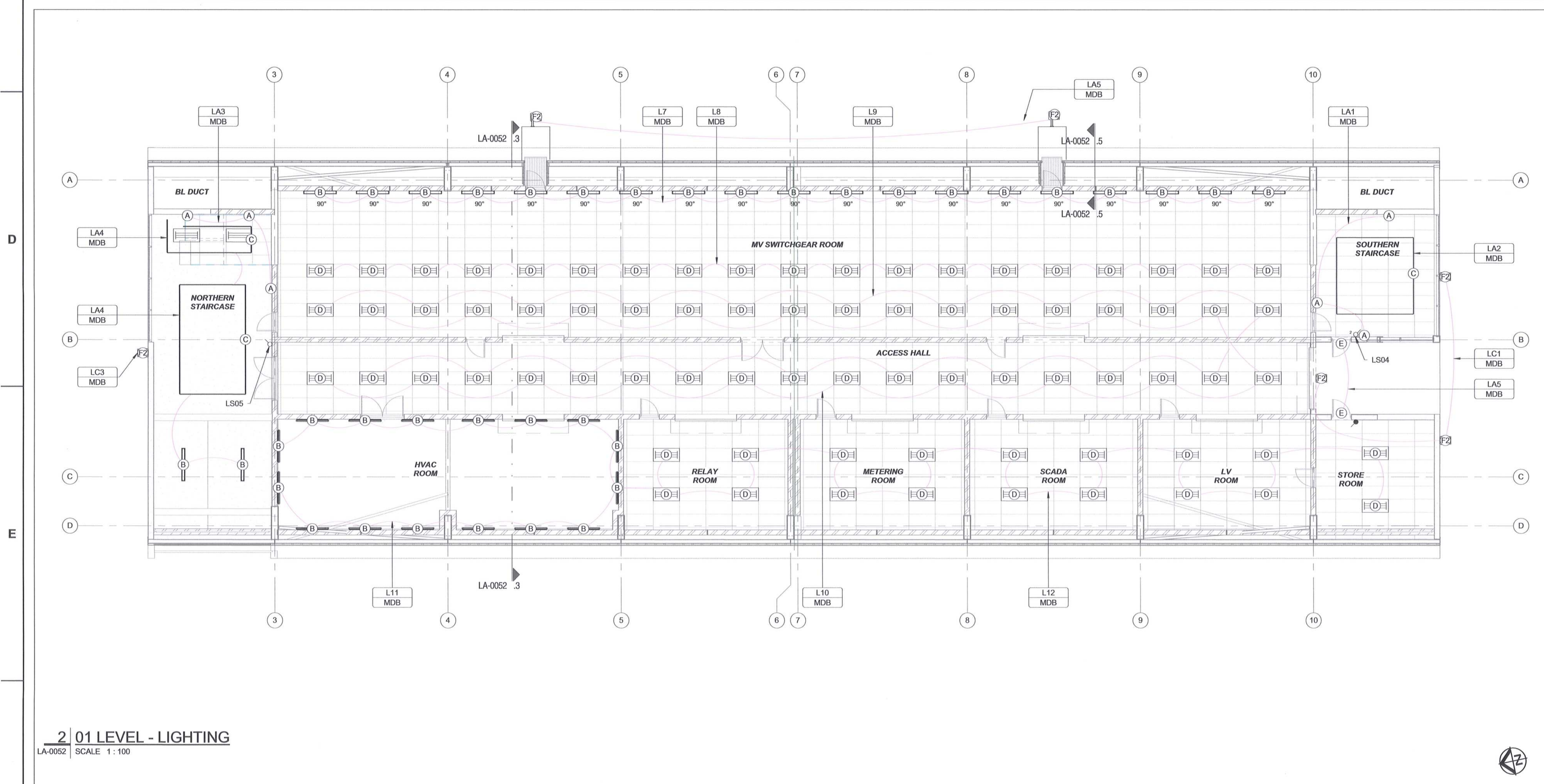
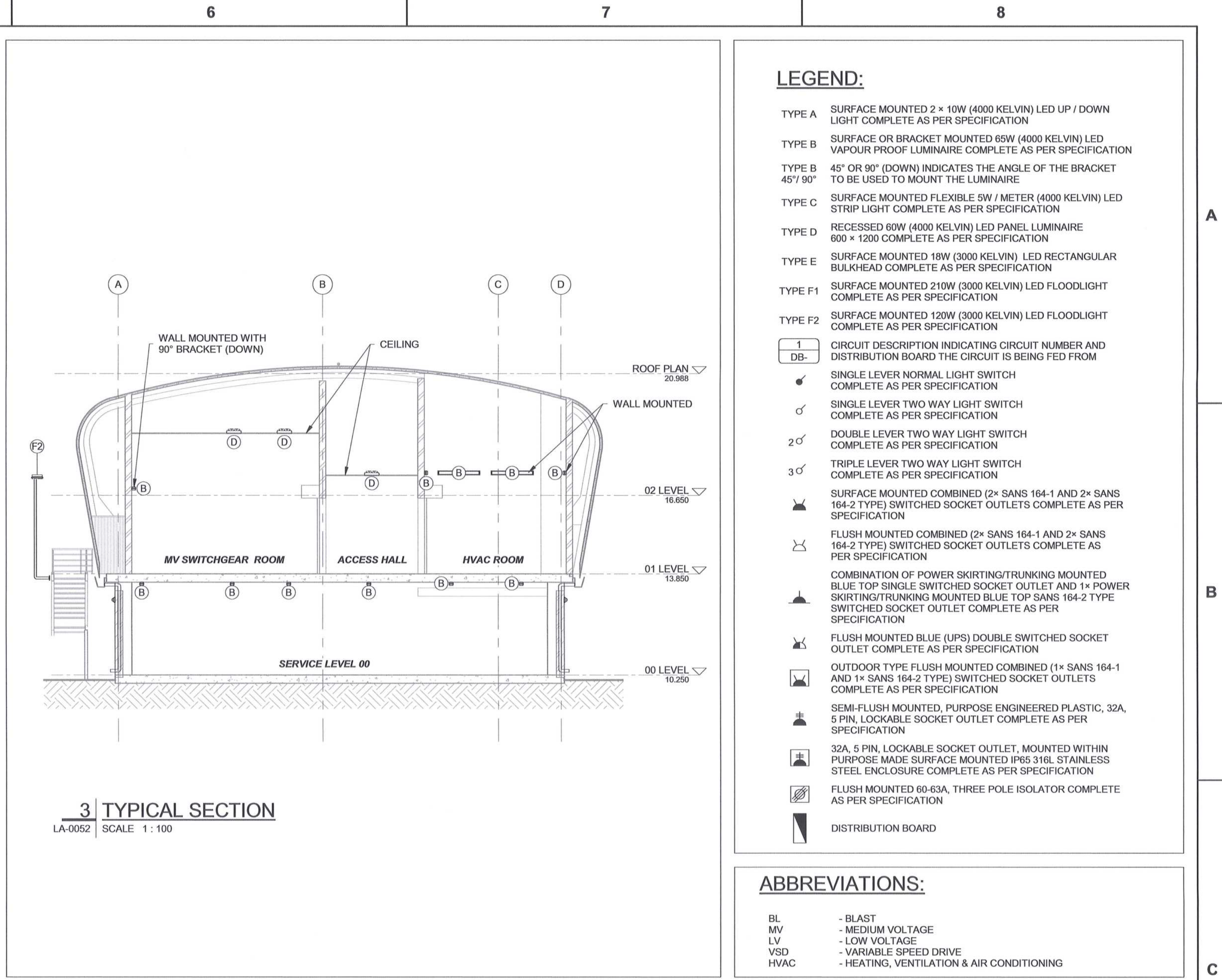
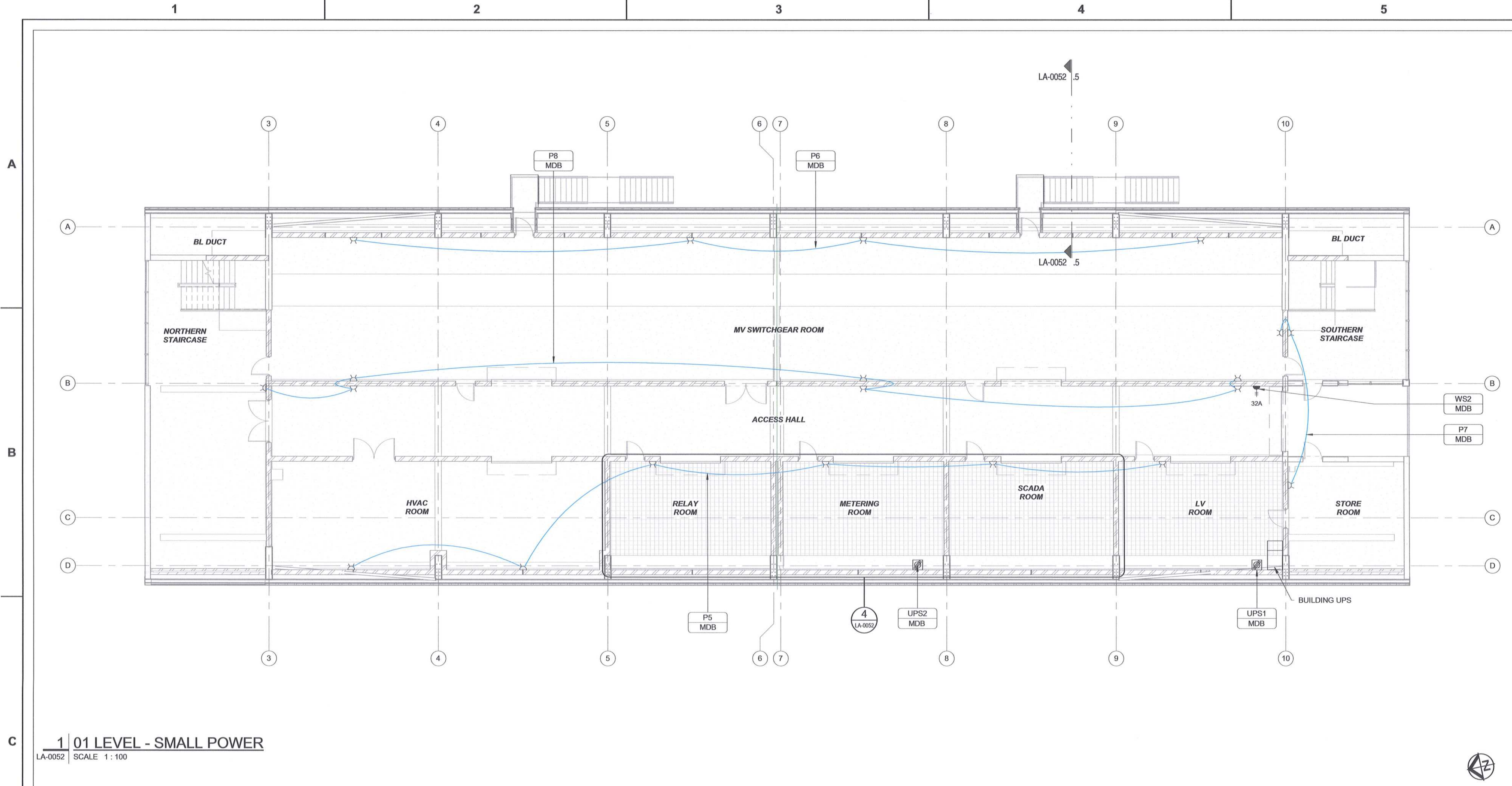
TRANSNET LTD (Pty) Ltd  
TABLE BAY BUILDING, TYGERBERG PARK  
163 LYS KORDE DRIVE, PLATTENLOEF, 6001

TEL: 021 945 1999  
FAX: 021 945 2459

**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT**  
BULK POWER UPGRADE:  
NEW MAIN INTAKE SUBSTATION  
LEVEL 00 - SMALL POWER AND LIGHTING  
LAYOUT

PROJECT NUMBER	DC	FBS	DES	TYPE	DRAWING NO.	SHEET	REV	ID
19	2	4	7	0	1	2	3	00



**NOTES**

- DO NOT SCALE DRAWINGS - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- FINAL POSITION OF ALL ELECTRICAL EQUIPMENT SHALL BE CONFIRMED ON SITE, IN CONJUNCTION WITH, AND APPROVAL OF, THE EMPLOYER.
- CONTRACTOR TO NOTE THAT ALL LIGHTING IS SWITCHED VIA DB MOUNTED CONTACTORS AND SUFFICIENT CONDUITING IS TO BE ALLOWED FOR.
- ALL ELECTRONIC SERVICES CABLING, SHALL BE DISTRIBUTED THROUGH THE BUILDING VIA SEPARATE CONDUITS AND DUCTING INFRASTRUCTURE.

**AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:**

- OFFERED LUMINAIRES PHOTOMETRICS AND DATA RESPECTIVE MV, LV, ELECTRONICS AND HVAC EQUIPMENT TO FINALISE POSITIONS OF LUMINAIRES, SOCKET OUTLETS, ISOLATORS AND THE LIKE
- L-BRACKETS FOR FIXING OF EXTERNAL FLOODLIGHTS

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**REVISIONS**

NO.	DESCRIPTION	DATE	BY	CHKD	APPD
00	ISSUED FOR CONSTRUCTION	2018-06-28	DD	BS	CP

**CONTRACTOR/CONSULTANT**

TITLE	NAME	SIGN	DATE
OPERATING DIVISIONS			
PR. ENG./PR. TECH./PR. ARCH			

**AECOM**

CAPE TOWN OFFICE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1968/00628/07

**CONTRACTOR/CONSULTANT**

TITLE	NAME	SIGN	DATE
OPERATING DIVISIONS			
PR. ENG./PR. TECH./PR. ARCH			

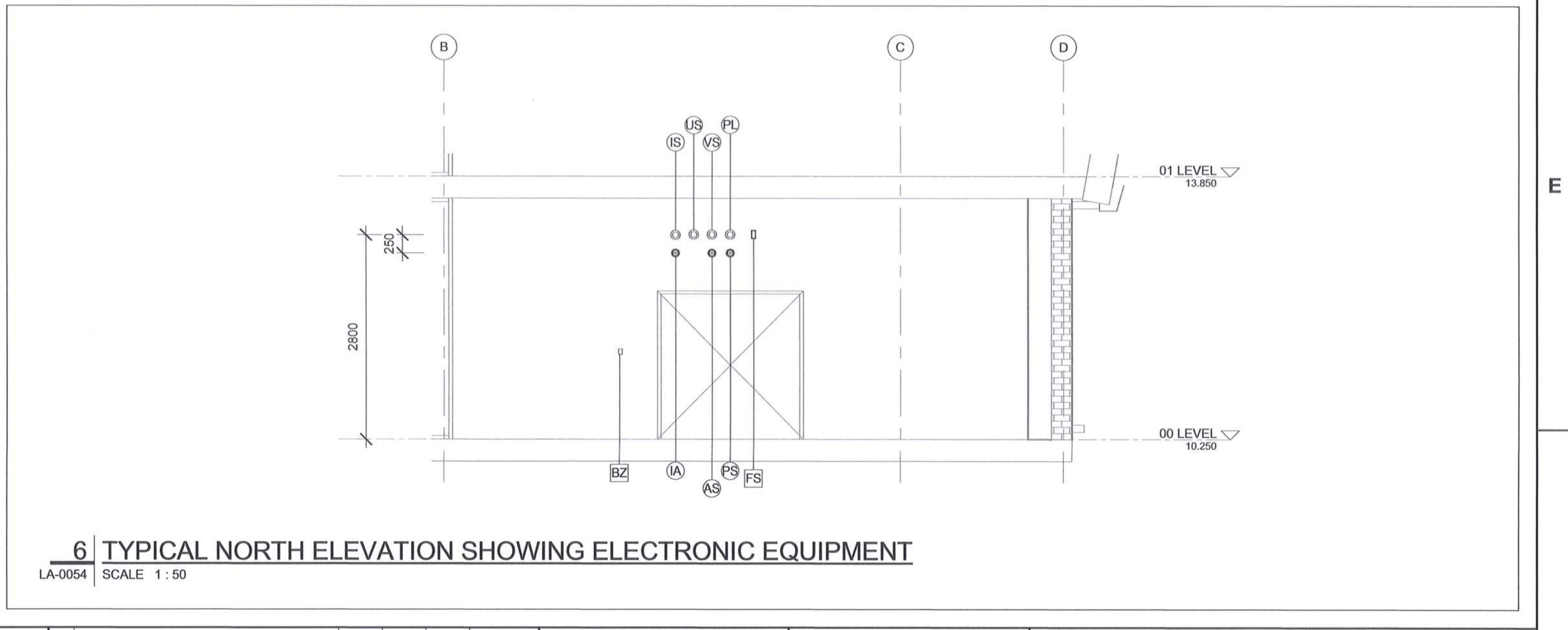
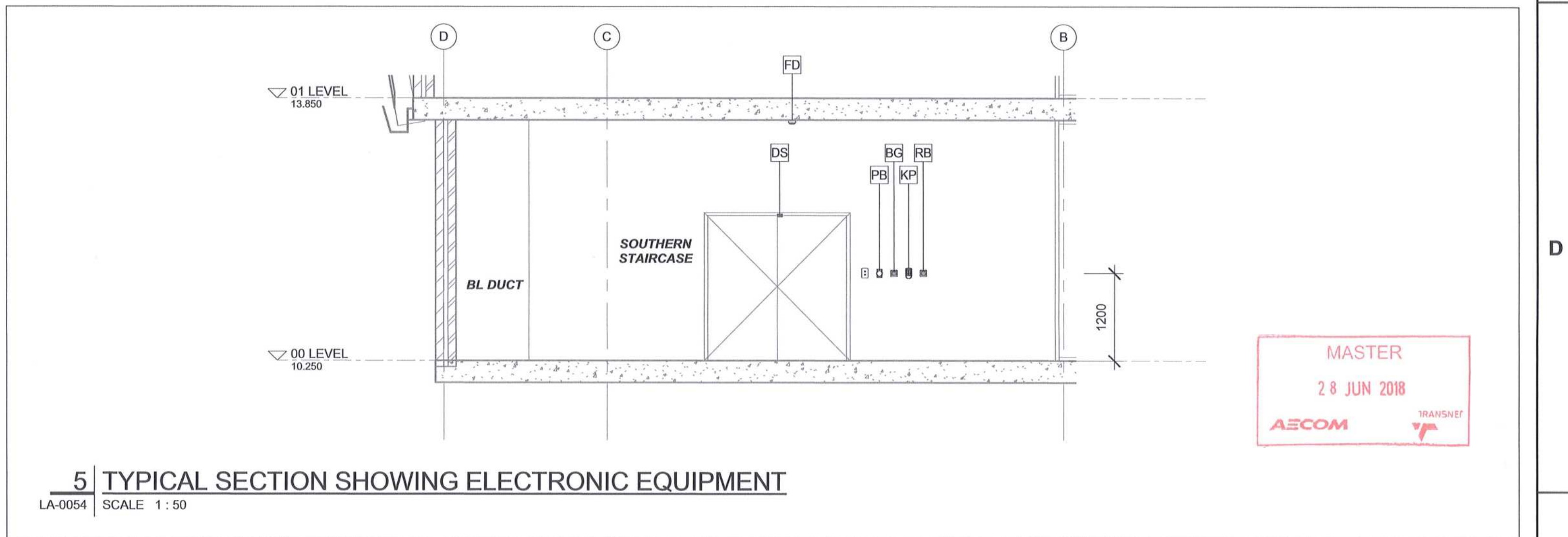
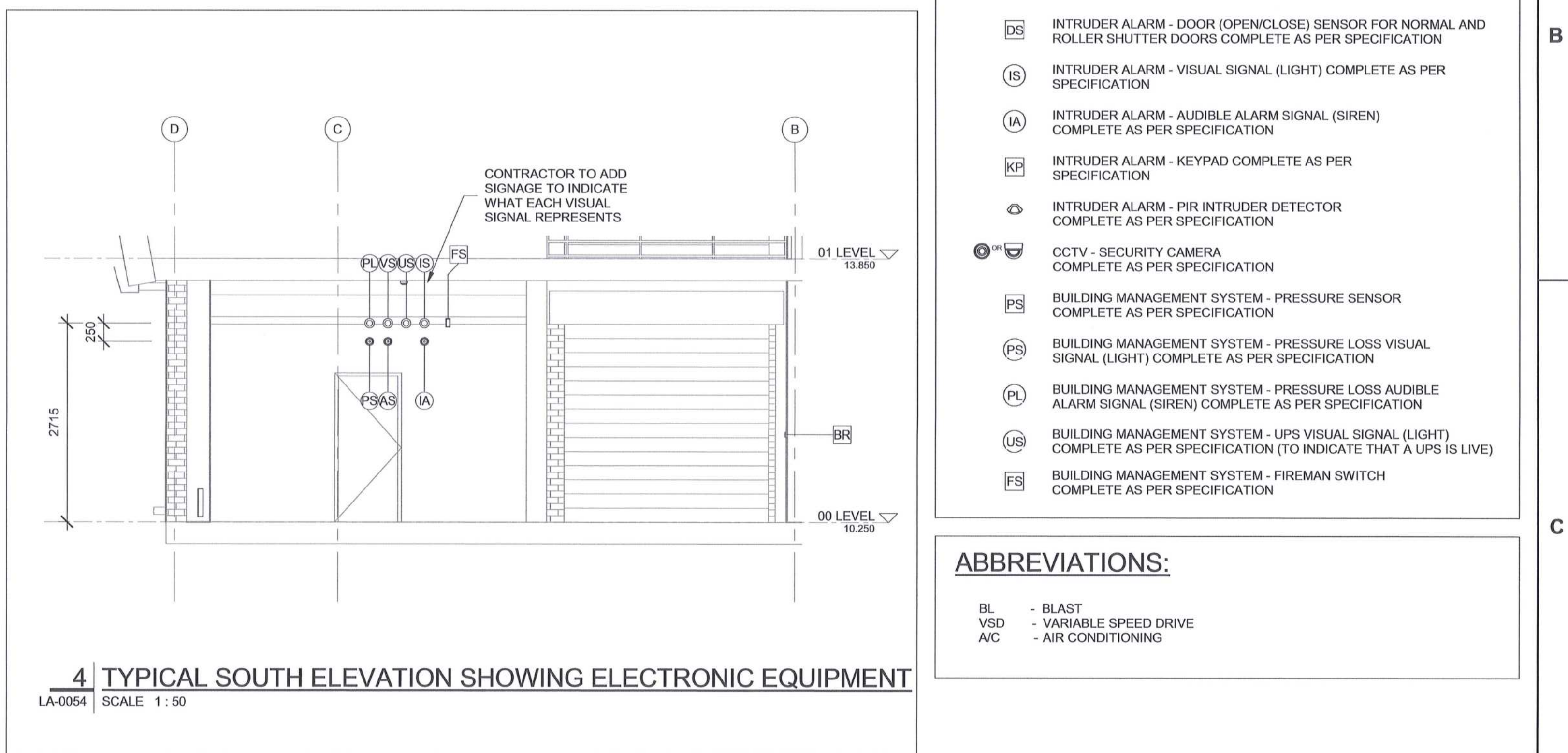
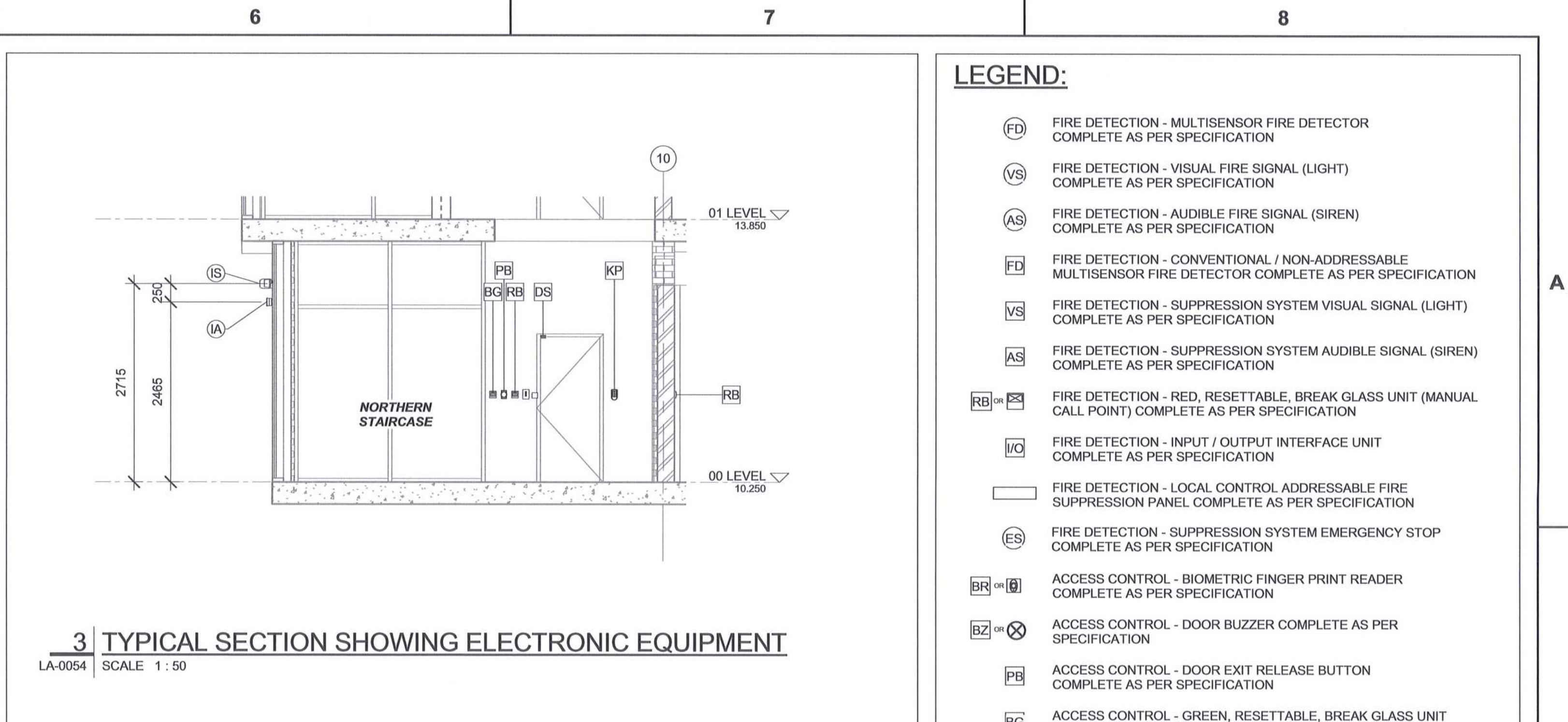
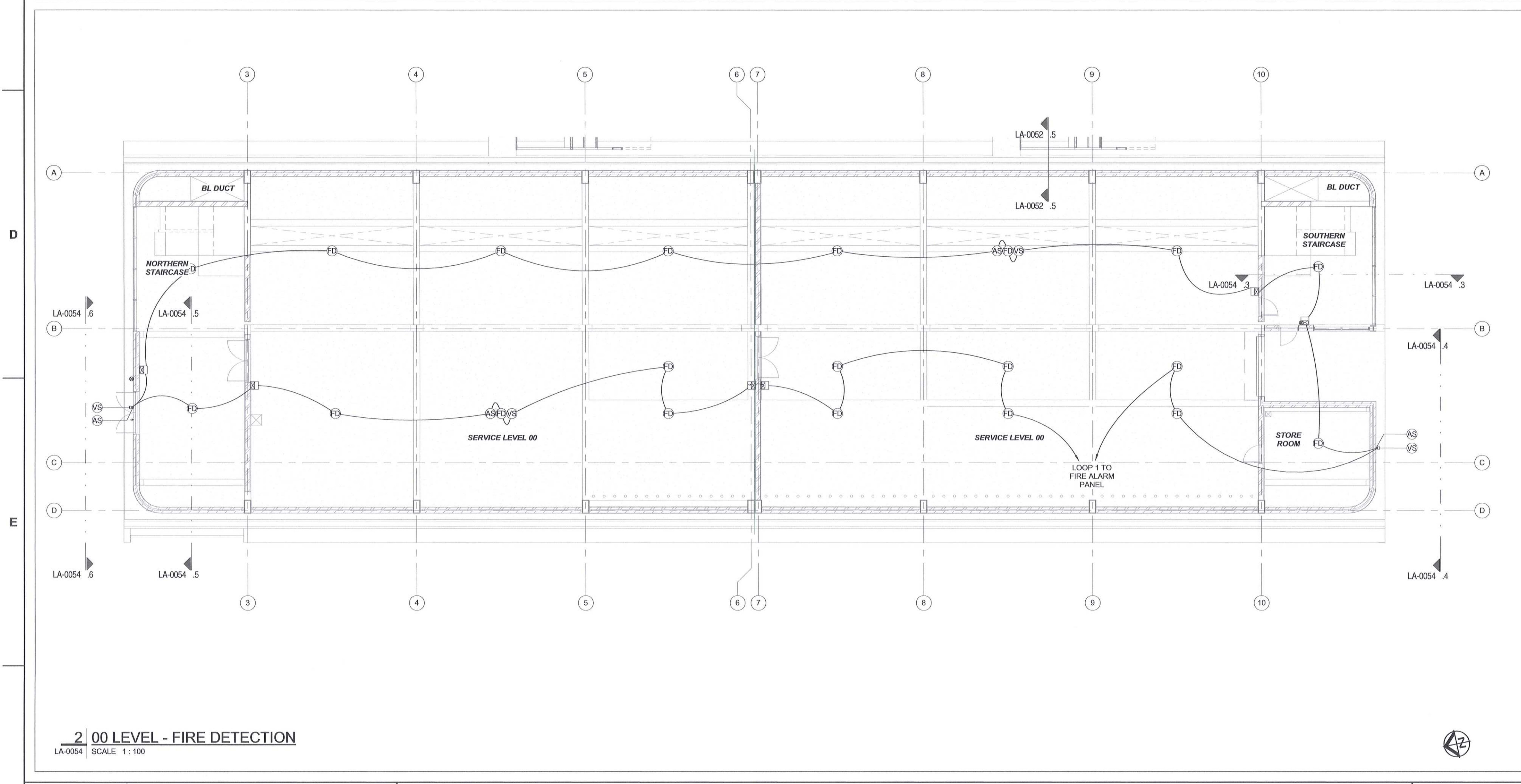
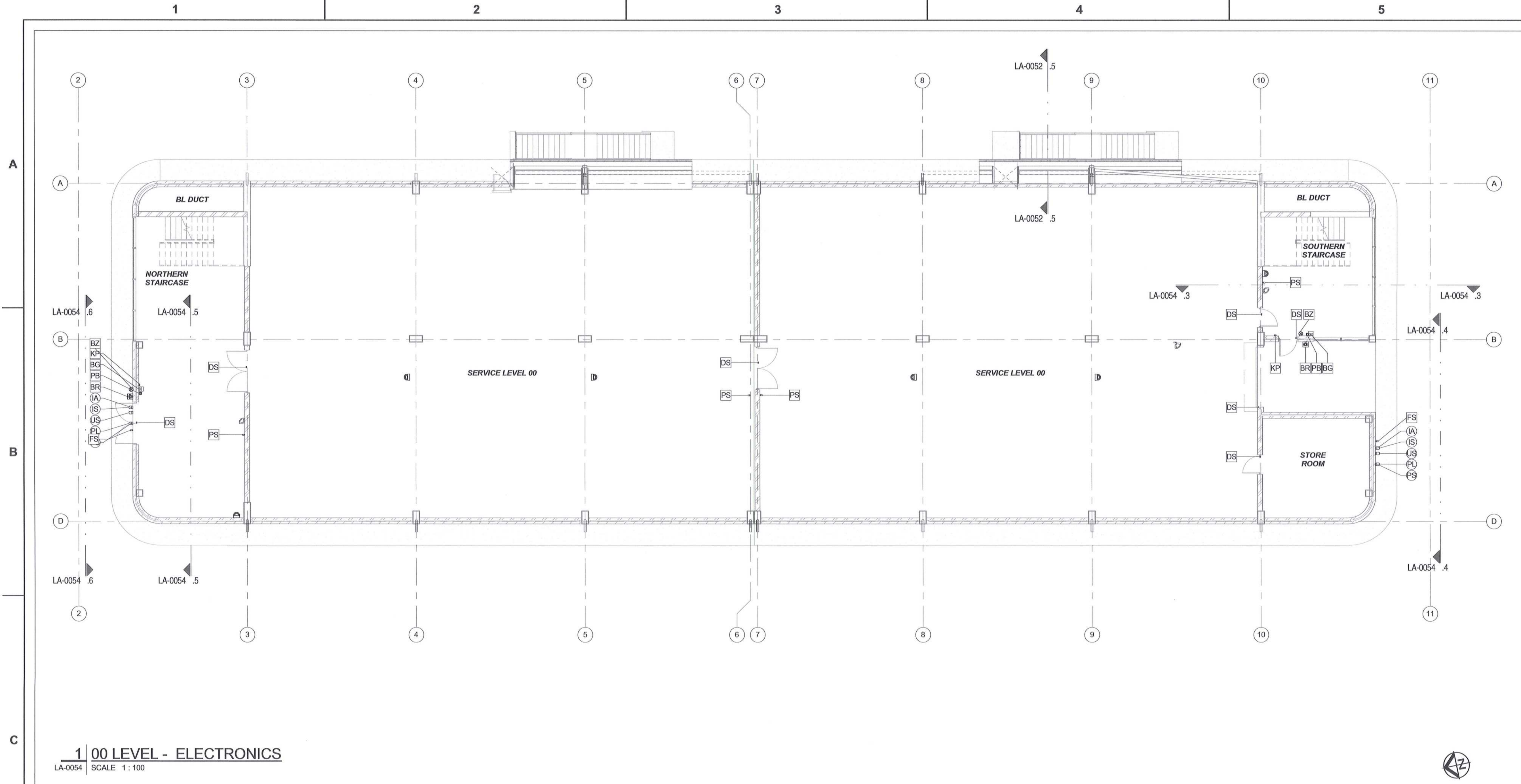
**TRANSNET CAPITAL PROJECTS**

TITLE	NAME	DATE
OPERATING DIVISIONS		
PR. ENG./PR. TECH./PR. ARCH		

**IRON ORE TIPLER 3 PROJECT BULK POWER UPGRADE - NEW MAIN INTAKE SUBSTATION LEVEL 01 - SMALL POWER AND LIGHTING LAYOUT**

PROJECT NUMBER	DD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	300	E	LA	0052	01	0	AE





- LEGEND:**
- FD FIRE DETECTION - MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION
  - VS FIRE DETECTION - VISUAL FIRE SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
  - AS FIRE DETECTION - AUDIBLE FIRE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
  - FD ADDRESSABLE FIRE DETECTOR COMPLETE AS PER SPECIFICATION
  - VS FIRE DETECTION - SUPPRESSION SYSTEM VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
  - AS FIRE DETECTION - SUPPRESSION SYSTEM AUDIBLE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
  - FB-R FIRE DETECTION - RED, RESETTABLE, BREAK GLASS UNIT (MANUAL CALL POINT) COMPLETE AS PER SPECIFICATION
  - IC FIRE DETECTION - INPUT / OUTPUT INTERFACE UNIT COMPLETE AS PER SPECIFICATION
  - ES FIRE DETECTION - LOCAL CONTROL ADDRESSABLE FIRE SUPPRESSION PANEL COMPLETE AS PER SPECIFICATION
  - ES FIRE DETECTION - SUPPRESSION SYSTEM EMERGENCY STOP COMPLETE AS PER SPECIFICATION
  - BR-BI ACCESS CONTROL - BIOMETRIC FINGER PRINT READER COMPLETE AS PER SPECIFICATION
  - BZ ACCESS CONTROL - DOOR BUZZER COMPLETE AS PER SPECIFICATION
  - PB ACCESS CONTROL - DOOR EXIT RELEASE BUTTON COMPLETE AS PER SPECIFICATION
  - BG ACCESS CONTROL - GREEN, RESETTABLE, BREAK GLASS UNIT COMPLETE AS PER SPECIFICATION
  - DS INTRUDER ALARM - DOOR (OPEN/CLOSE) SENSOR FOR NORMAL AND ROLLER SHUTTER DOORS COMPLETE AS PER SPECIFICATION
  - IS INTRUDER ALARM - VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
  - IA INTRUDER ALARM - AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
  - KP INTRUDER ALARM - KEYPAD COMPLETE AS PER SPECIFICATION
  - PIR INTRUDER ALARM - PIR INTRUDER DETECTOR COMPLETE AS PER SPECIFICATION
  - CCTV SECURITY CAMERA COMPLETE AS PER SPECIFICATION
  - PS BUILDING MANAGEMENT SYSTEM - PRESSURE SENSOR COMPLETE AS PER SPECIFICATION
  - PS BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
  - PL BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
  - US BUILDING MANAGEMENT SYSTEM - UPS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION (TO INDICATE THAT A UPS IS LIVE)
  - FS BUILDING MANAGEMENT SYSTEM - FIREMAN SWITCH COMPLETE AS PER SPECIFICATION

- ABBREVIATIONS:**
- BL - BLAST
  - VSD - VARIABLE SPEED DRIVE
  - A/C - AIR CONDITIONING

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

- DO NOT SCALE DRAWINGS - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- FINAL DESIGNS TO BE UNDERTAKEN BY SPECIALIST CONTRACTOR(S) / OEM(S).
- FINAL POSITION OF ALL ELECTRONIC EQUIPMENT SHALL BE CONFIRMED ON SITE, IN CONJUNCTION WITH, AND APPROVAL OF, THE EMPLOYER.

5. ALL ELECTRICAL SERVICES CABLING SHALL BE DISTRIBUTED THROUGH THE BUILDING VIA SEPARATE CONDUITS AND DUCTING INFRASTRUCTURE.

AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:

- ICT
- CCTV
- ACCESS CONTROL
- INTRUDER ALARM
- UPS
- FIRE DETECTION
- OTHER ASSOCIATED SYSTEMS
- ALL LABELLING OF EQUIPMENT INCLUDING EXTERNAL INDICATION LIGHTS SIGNAGE

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE

TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1968/006628/07

NO	ISSUED FOR CONSTRUCTION	DD	BS	CP	DATE
00	ISSUED FOR CONSTRUCTION	DD	BS	CP	2018-06-28

**REVISIONS**

This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

CONTRACTOR/CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	DD		18 06 28
				CHECKED	OC		18 06 28
				DESIGNED	LK		18 06 28
				CHECKED	BS		18 06 28

**OPERATING DIVISIONS**

TITLE	NAME	SIGN	DATE
PR.ENG./PR.TECH./PR.ARCH			

PR.ENG./PR.TECH./PR.ARCH  
NAME: C. PYM  
SIGNATURE: [Signature]  
REG. NUMBER: 201270138  
SCALE: AS SHOWN

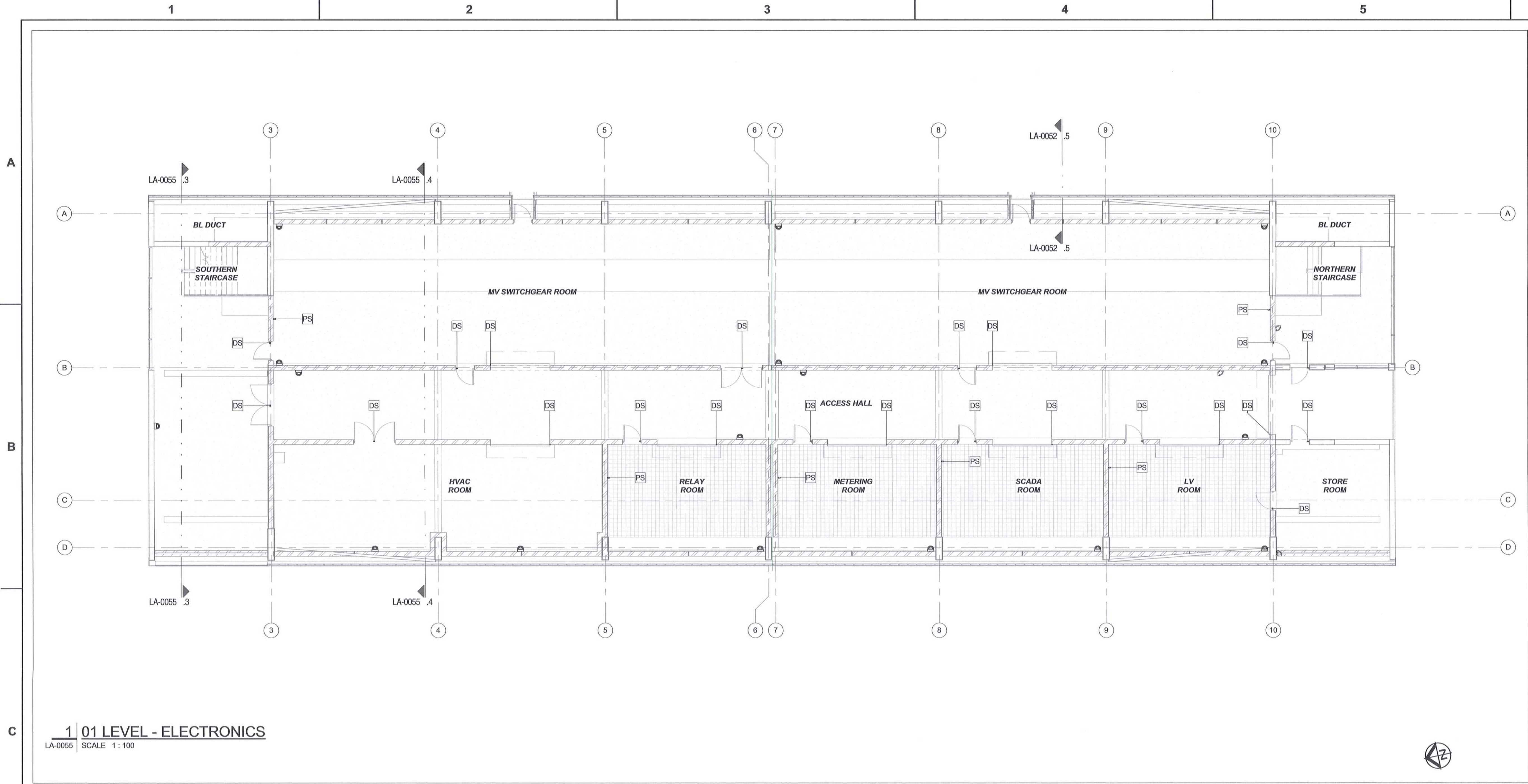
Transnet Capital Projects

TRANSNET CAPITAL PROJECTS  
TRANSNET LTD (TRANSNET AS TRANSNET CAPITAL PROJECTS) REG. NO. 19999898000  
TABLE BAY BUILDING, TYGERBERG PARK  
163 UPS KORSE DRIVE, PLATTENKLOOF, 6001  
TEL: 021 945 1999  
FAX: 021 945 2455

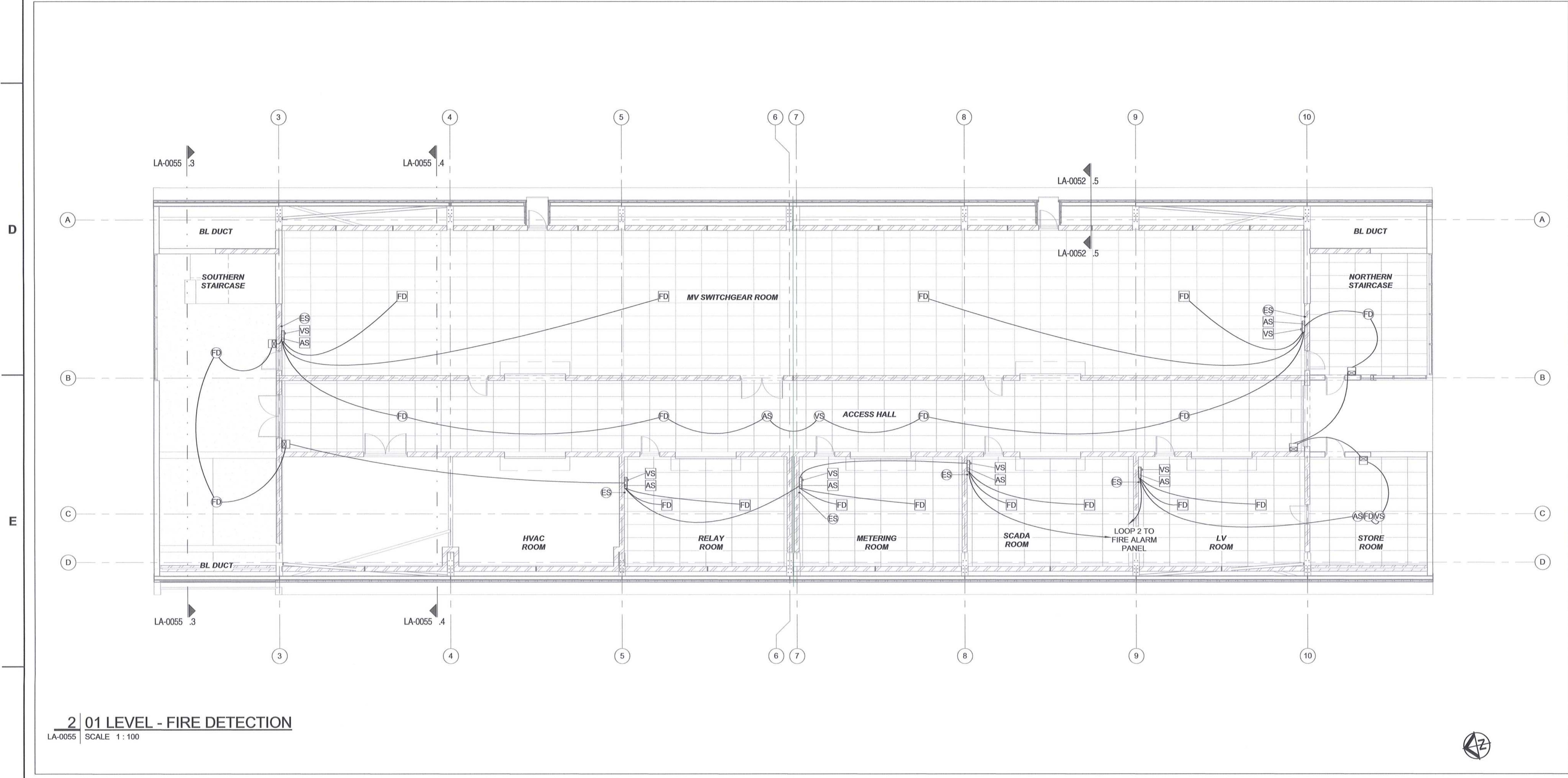
**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT**  
BULK POWER UPGRADE:  
NEW MAIN INTAKE SUBSTATION  
LEVEL 00 - ELECTRONIC SERVICES LAYOUT

PROJECT NUMBER: 1924701  
DD: 2  
PBS: 3  
DIS: 0  
TYPE: E  
DRAWING NO: LA 0054  
SHEET: 01  
REV: 00



1 | 01 LEVEL - ELECTRONICS  
LA-0055 | SCALE 1:100



2 | 01 LEVEL - FIRE DETECTION  
LA-0055 | SCALE 1:100

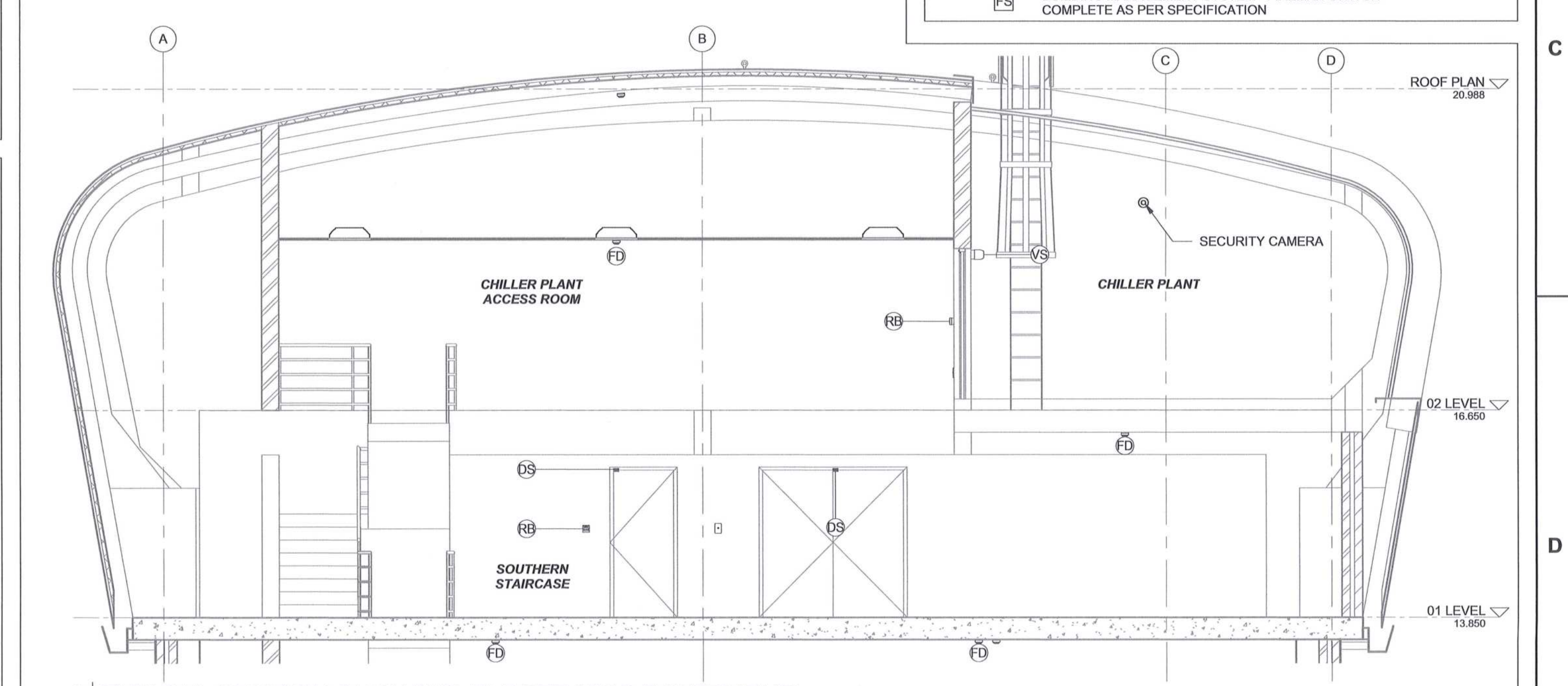
**ABBREVIATIONS:**

- BL - BLAST
- VSD - VARIABLE SPEED DRIVE
- A/C - AIR CONDITIONING

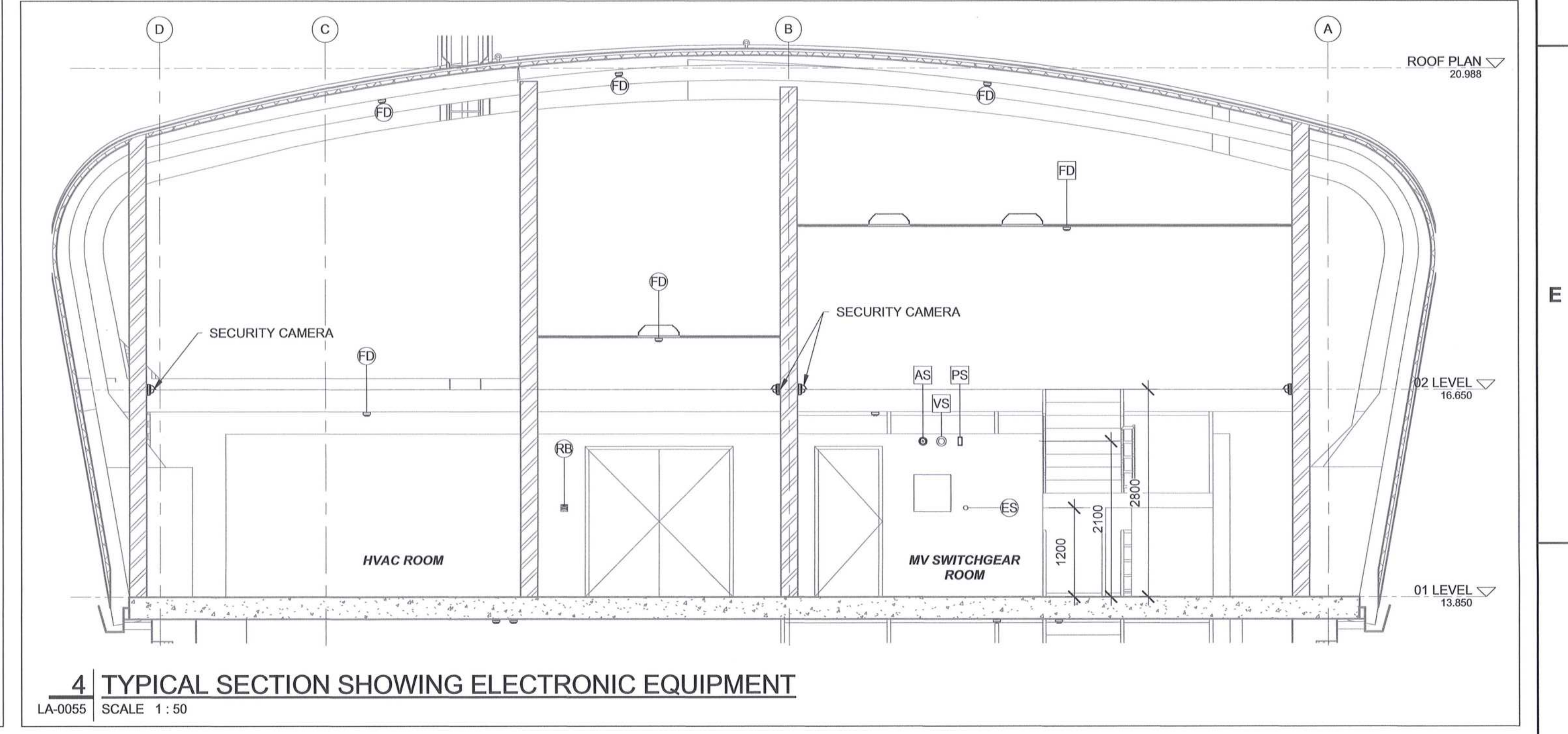
**LEGEND:**

- FD - FIRE DETECTION - MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION
- VS - FIRE DETECTION - VISUAL FIRE SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- AS - FIRE DETECTION - AUDIBLE FIRE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- FD - FIRE DETECTION - CONVENTIONAL / NON-ADDRESSABLE MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION
- VS - FIRE DETECTION - SUPPRESSION SYSTEM VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- AS - FIRE DETECTION - SUPPRESSION SYSTEM AUDIBLE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- RS - FIRE DETECTION - RED, RESETTABLE, BREAK GLASS UNIT (MANUAL CALL POINT) COMPLETE AS PER SPECIFICATION
- IC - FIRE DETECTION - INPUT / OUTPUT INTERFACE UNIT COMPLETE AS PER SPECIFICATION
- ES - FIRE DETECTION - LOCAL CONTROL ADDRESSABLE FIRE SUPPRESSION PANEL COMPLETE AS PER SPECIFICATION
- ES - FIRE DETECTION - SUPPRESSION SYSTEM EMERGENCY STOP COMPLETE AS PER SPECIFICATION
- BR - ACCESS CONTROL - BIOMETRIC FINGER PRINT READER COMPLETE AS PER SPECIFICATION
- BZ - ACCESS CONTROL - DOOR BUZZER COMPLETE AS PER SPECIFICATION
- PB - ACCESS CONTROL - DOOR EXIT RELEASE BUTTON COMPLETE AS PER SPECIFICATION
- BG - ACCESS CONTROL - GREEN, RESETTABLE, BREAK GLASS UNIT COMPLETE AS PER SPECIFICATION
- DS - INTRUDER ALARM - DOOR (OPEN/CLOSE) SENSOR FOR NORMAL AND ROLLER SHUTTER DOORS COMPLETE AS PER SPECIFICATION
- IS - INTRUDER ALARM - VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- IA - INTRUDER ALARM - AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- IP - INTRUDER ALARM - KEYPAD COMPLETE AS PER SPECIFICATION
- IS - INTRUDER ALARM - PIR INTRUDER DETECTOR COMPLETE AS PER SPECIFICATION
- CC - CCTV - SECURITY CAMERA COMPLETE AS PER SPECIFICATION
- PS - BUILDING MANAGEMENT SYSTEM - PRESSURE SENSOR COMPLETE AS PER SPECIFICATION
- PS - BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- PS - BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- US - BUILDING MANAGEMENT SYSTEM - UPS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION (TO INDICATE THAT A UPS IS LIVE)
- FS - BUILDING MANAGEMENT SYSTEM - FIREMAN SWITCH COMPLETE AS PER SPECIFICATION

MASTER  
28 JUN 2018  
AECOM



3 | TYPICAL SECTION SHOWING ELECTRONIC EQUIPMENT  
LA-0055 | SCALE 1:50



4 | TYPICAL SECTION SHOWING ELECTRONIC EQUIPMENT  
LA-0055 | SCALE 1:50

**NOTES**

1. DO NOT SCALE DRAWINGS - ONLY DIMENSIONS SHOWN TO BE USED.
2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
3. FINAL DESIGNS TO BE UNDERTAKEN BY SPECIALIST CONTRACTOR(S) / OEM(S).
4. FINAL POSITION OF ALL ELECTRONIC EQUIPMENT SHALL BE CONFIRMED ON SITE, IN CONJUNCTION WITH, AND APPROVAL OF, THE EMPLOYER.
5. ALL ELECTRICAL SERVICES CABLING, SHALL BE DISTRIBUTED THROUGH THE BUILDING VIA SEPARATE CONDUITS AND DUCTING INFRASTRUCTURE.

AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:

- ICT
- CCTV
- ACCESS CONTROL
- INTRUDER ALARM
- UPS
- FIRE DETECTION
- OTHER ASSOCIATED SYSTEMS
- ALL LABELING OF EQUIPMENT INCLUDING EXTERNAL INDICATION LIGHTS SIGNAGE



CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1966/006628/07

CONTRACTOR/CONSULTANT		TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE		
<b>OPERATING DIVISIONS</b>					
TITLE	NAME	SIGN	DATE		
<b>REVISIONS</b>					
NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	BS	CP	2018-06-26

CONTRACTOR/CONSULTANT		TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE		
<b>OPERATING DIVISIONS</b>					
TITLE	NAME	SIGN	DATE		
<b>REVISIONS</b>					
NO	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	BS	CP	2018-06-26

**TRANSNET**

TRANSNET CAPITAL PROJECTS  
TABLE BAY BUILDING, TYGERBERG PARK,  
163 UFS KRIGE DRIVE, PLATTENLOOF,  
6001

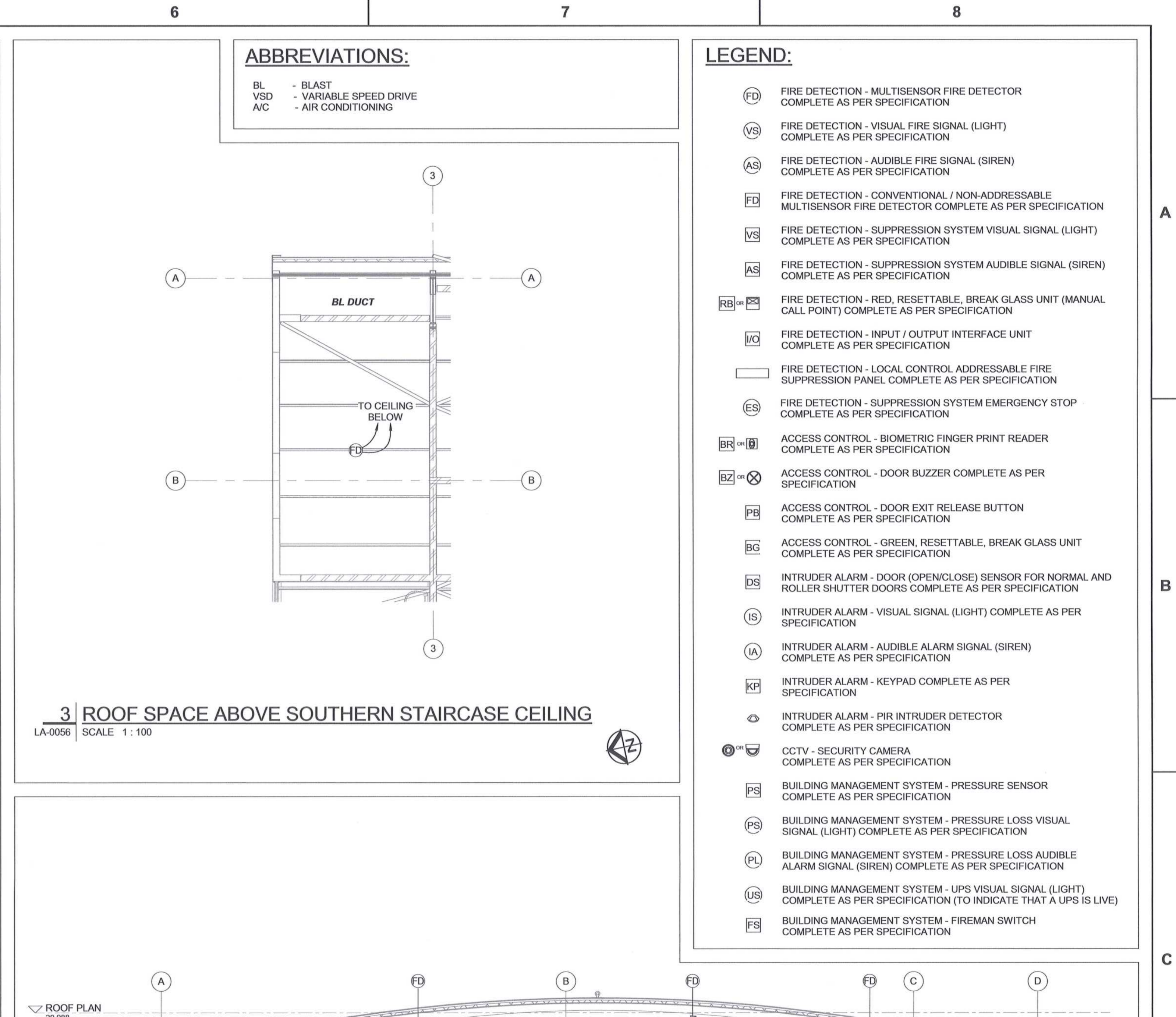
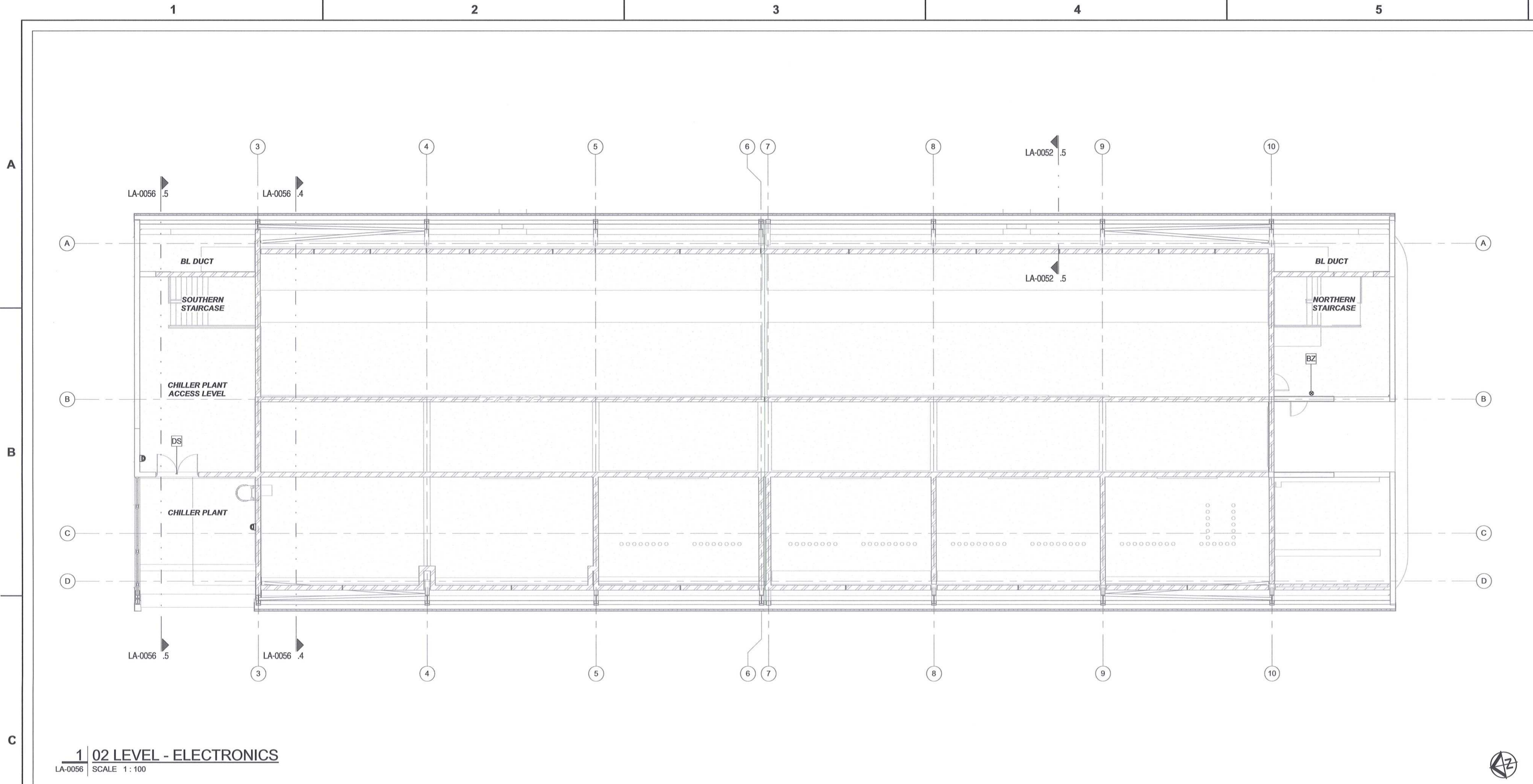
TEL: 021 943 1999  
FAX: 021 943 2455

**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT  
BULK POWER UPGRADE  
NEW MAIN INTAKE SUBSTATION  
LEVEL 01 - ELECTRONIC SERVICES LAYOUT**

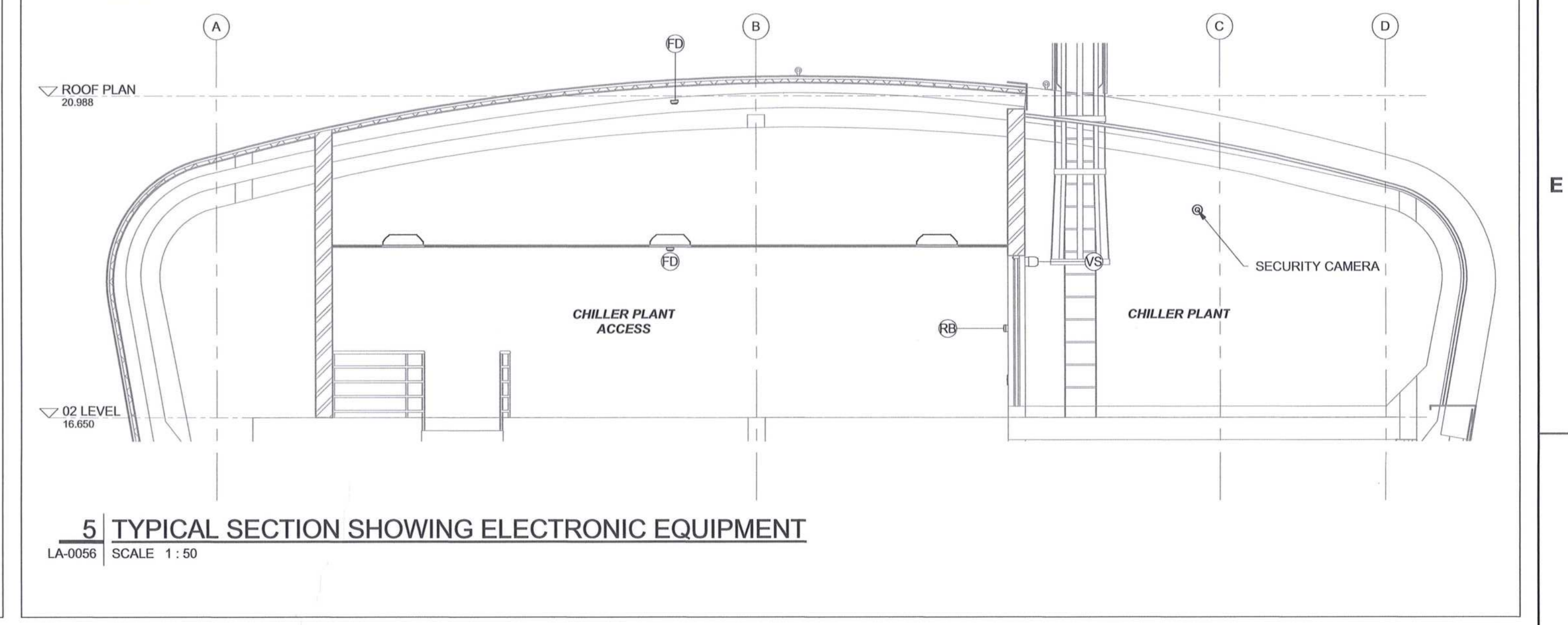
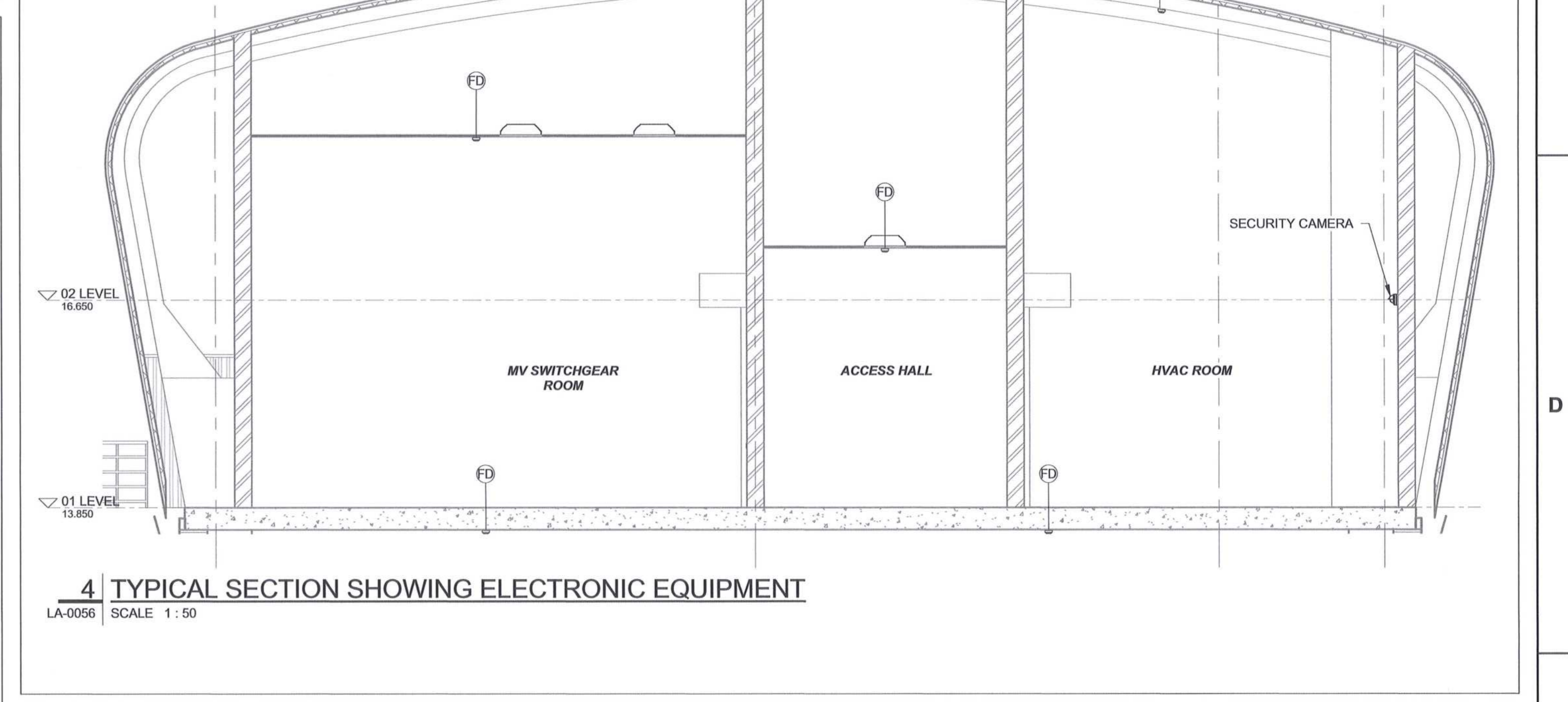
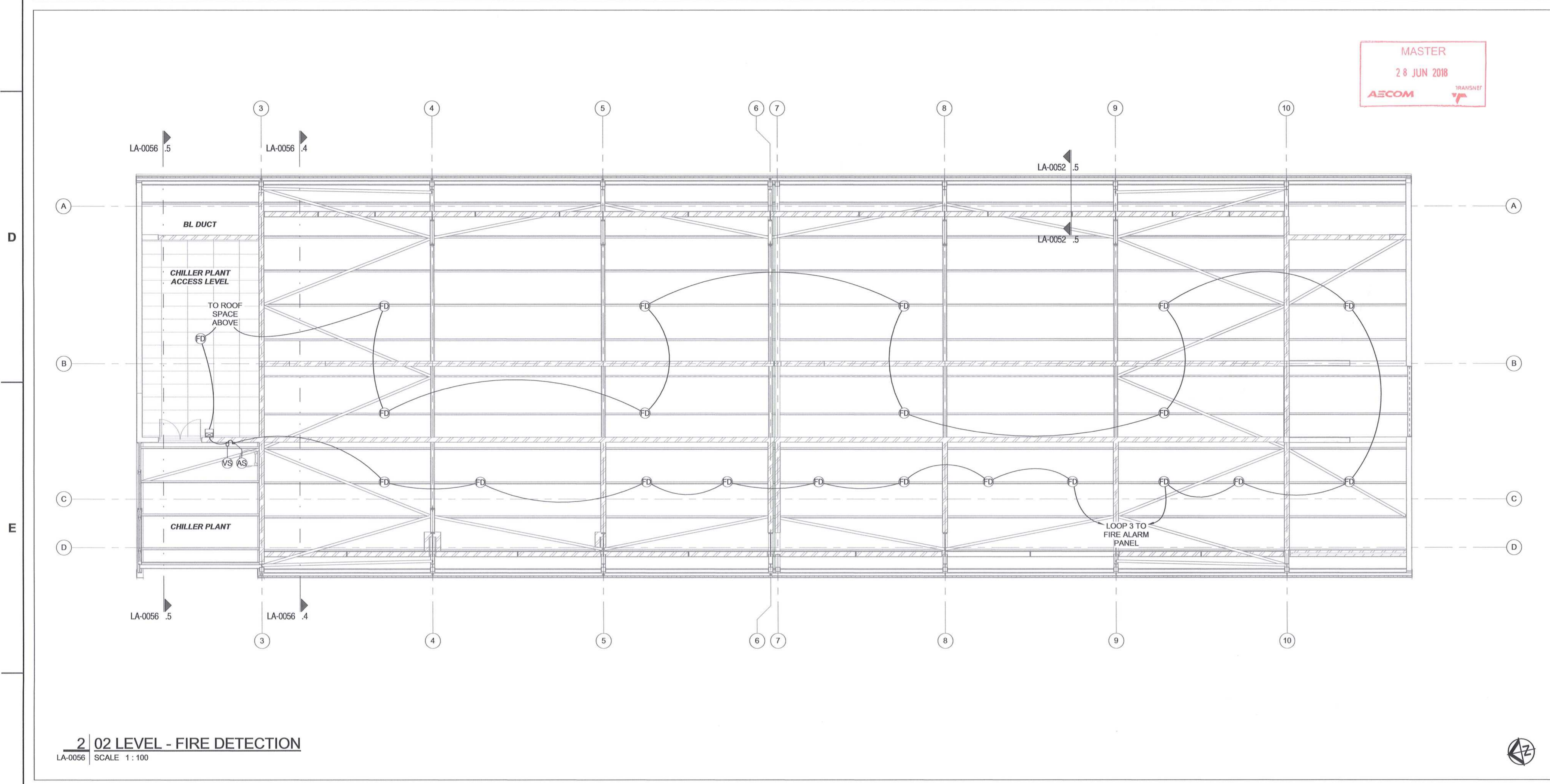
PROJECT NUMBER	000	FBS	DSS	TYPE	DRAWING NO	SHEET	REV	ID
19	2	4	7	0	1	2	3	00

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS



**ABBREVIATIONS:**  
 BL - BLAST  
 VSD - VARIABLE SPEED DRIVE  
 AC - AIR CONDITIONING

- LEGEND:**
- (FD) FIRE DETECTION - MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION
  - (VS) FIRE DETECTION - VISUAL FIRE SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
  - (AS) FIRE DETECTION - AUDIBLE FIRE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
  - FD FIRE DETECTION - CONVENTIONAL / NON-ADDRESSABLE MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION
  - VS FIRE DETECTION - SUPPRESSION SYSTEM VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
  - AS FIRE DETECTION - SUPPRESSION SYSTEM AUDIBLE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
  - FD (R) FIRE DETECTION - RED, RESETTABLE, BREAK GLASS UNIT (MANUAL CALL POINT) COMPLETE AS PER SPECIFICATION
  - IC FIRE DETECTION - INPUT / OUTPUT INTERFACE UNIT COMPLETE AS PER SPECIFICATION
  - FD (L) FIRE DETECTION - LOCAL CONTROL ADDRESSABLE FIRE SUPPRESSION PANEL COMPLETE AS PER SPECIFICATION
  - ES FIRE DETECTION - SUPPRESSION SYSTEM EMERGENCY STOP COMPLETE AS PER SPECIFICATION
  - BR (I) ACCESS CONTROL - BIOMETRIC FINGER PRINT READER COMPLETE AS PER SPECIFICATION
  - BZ (X) ACCESS CONTROL - DOOR BUZZER COMPLETE AS PER SPECIFICATION
  - PB ACCESS CONTROL - DOOR EXIT RELEASE BUTTON COMPLETE AS PER SPECIFICATION
  - BG ACCESS CONTROL - GREEN, RESETTABLE, BREAK GLASS UNIT COMPLETE AS PER SPECIFICATION
  - DS INTRUDER ALARM - DOOR (OPEN/CLOSE) SENSOR FOR NORMAL AND ROLLER SHUTTER DOORS COMPLETE AS PER SPECIFICATION
  - IS INTRUDER ALARM - VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
  - IA INTRUDER ALARM - AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
  - KA INTRUDER ALARM - KEYPAD COMPLETE AS PER SPECIFICATION
  - PI INTRUDER ALARM - PIR INTRUDER DETECTOR COMPLETE AS PER SPECIFICATION
  - CCV SECURITY CAMERA COMPLETE AS PER SPECIFICATION
  - PS BUILDING MANAGEMENT SYSTEM - PRESSURE SENSOR COMPLETE AS PER SPECIFICATION
  - PLS BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
  - PLA BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
  - ULS BUILDING MANAGEMENT SYSTEM - UPS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION (TO INDICATE THAT A UPS IS LIVE)
  - FS BUILDING MANAGEMENT SYSTEM - FIREMAN SWITCH COMPLETE AS PER SPECIFICATION



MASTER  
 28 JUN 2018  
 AECOM

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

- DO NOT SCALE DRAWINGS - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- FINAL DESIGNS TO BE UNDERTAKEN BY SPECIALIST CONTRACTOR(S) / OEM(S).
- FINAL POSITION OF ALL ELECTRONIC EQUIPMENT SHALL BE CONFIRMED ON SITE, IN CONJUNCTION WITH, AND APPROVAL OF, THE EMPLOYER.

5. ALL ELECTRICAL SERVICES CABLING, SHALL BE DISTRIBUTED THROUGH THE BUILDING VIA SEPARATE CONDUITS AND DUCTING INFRASTRUCTURE.

AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:

- ICT
- CCTV
- ACCESS CONTROL
- INTRUDER ALARM
- LIPS
- FIRE DETECTION
- OTHER ASSOCIATED SYSTEMS
- ALL LABELING OF EQUIPMENT INCLUDING EXTERNAL INDICATION LIGHTS SIGNAGE

**AECOM**

CAPE TOWN OFFICE  
 WATERSIDE PLACE, SOUTH GATE  
 TYGER WATERFRONT  
 CARL CRONJE DRIVE  
 TEL: +27 (0)21 950 7500  
 FAX: +27 (0)21 950 7502  
 REG. NO. 1966/00628/07

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	BS	CP	2018-06-20

**REVISIONS**

This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

CONTRACTOR/CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	SIGN	DATE

OPERATING DIVISIONS		PR.ENG./PR.TECH./PR.ARCH	
TITLE	NAME	SIGN	DATE

**TRANSNET CAPITAL PROJECTS**

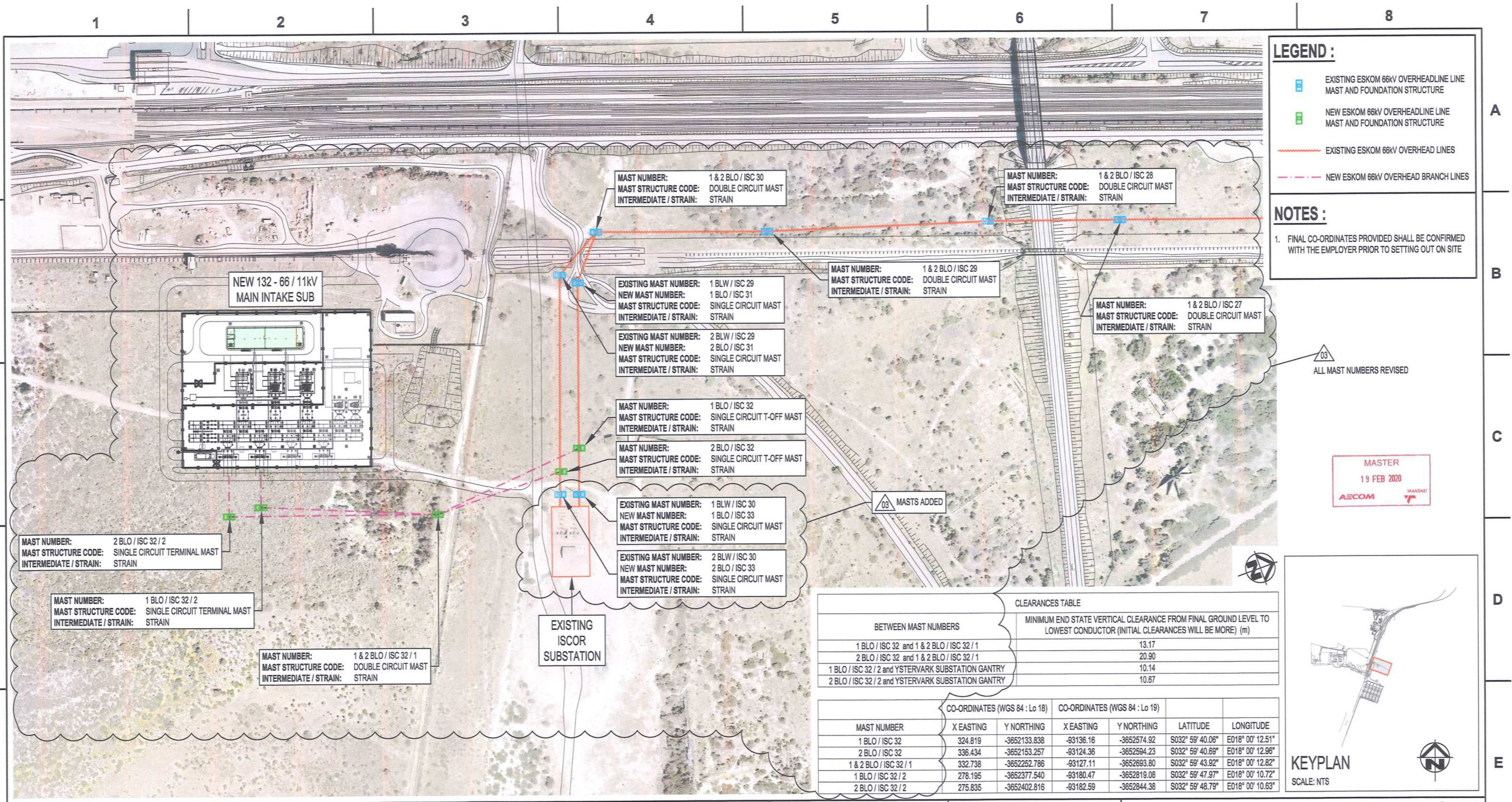
TRANSNET (Pty) Limited, 41 Harbour Road, Durban, KwaZulu-Natal, 3600  
 163 UFS KIRGE DRIVE, PLATTENLOOF, 6001

TEL: 021 940 1999  
 FAX: 086 272 2850

**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT  
 BULK POWER UPGRADE:  
 NEW MAIN INTAKE SUBSTATION  
 LEVEL 02 AND ROOF - ELECTRONIC SERVICES  
 LAYOUT**

PROJECT NUMBER	DD	FBS	DES	TYPE	DRAWING NO.	SHEET	REV.	ID.
19	2	4	7	0	1	1	0	0



**LEGEND :**

- EXISTING ESKOM 66kV OVERHEADLINE LINE MAST AND FOUNDATION STRUCTURE
- NEW ESKOM 66kV OVERHEADLINE LINE MAST AND FOUNDATION STRUCTURE
- EXISTING ESKOM 66kV OVERHEAD LINES
- NEW ESKOM 66kV OVERHEAD BRANCH LINES

**NOTES :**

- FINAL CO-ORDINATES PROVIDED SHALL BE CONFIRMED WITH THE EMPLOYER PRIOR TO SETTING OUT ON SITE

03 ALL MAST NUMBERS REVISED

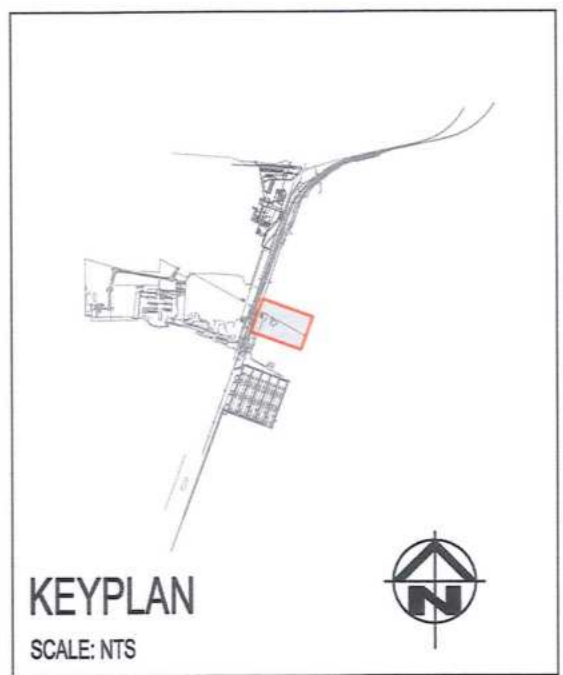
MASTER  
19 FEB 2020  
AECOM TRANSNET

**CLEARANCES TABLE**

BETWEEN MAST NUMBERS	MINIMUM END STATE VERTICAL CLEARANCE FROM FINAL GROUND LEVEL TO LOWEST CONDUCTOR (INITIAL CLEARANCES WILL BE MORE) (m)
1 BLO / ISC 32 and 1 & 2 BLO / ISC 32 / 1	13.17
2 BLO / ISC 32 and 1 & 2 BLO / ISC 32 / 1	20.90
1 BLO / ISC 32 / 2 and YSTERVARK SUBSTATION GANTRY	10.14
2 BLO / ISC 32 / 2 and YSTERVARK SUBSTATION GANTRY	10.87

**CO-ORDINATES (WGS 84 : Lo 18) CO-ORDINATES (WGS 84 : Lo 19)**

MAST NUMBER	X EASTING	Y NORTHING	X EASTING	Y NORTHING	LATITUDE	LONGITUDE
1 BLO / ISC 32	324.819	-3652133.838	-93136.16	-3652574.92	S032° 59' 40.06"	E018° 00' 12.51"
2 BLO / ISC 32	336.434	-3652153.257	-93124.36	-3652594.23	S032° 59' 40.69"	E018° 00' 12.96"
1 & 2 BLO / ISC 32 / 1	332.738	-3652262.786	-93127.11	-3652693.80	S032° 59' 43.92"	E018° 00' 12.82"
1 BLO / ISC 32 / 2	278.195	-3652377.540	-93180.47	-3652619.08	S032° 59' 47.97"	E018° 00' 10.72"
2 BLO / ISC 32 / 2	275.835	-3652402.816	-93182.59	-3652644.38	S032° 59' 48.79"	E018° 00' 10.63"



**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

**REFERENCE DRAWINGS**

DRAWING NO.	REFERENCE
1	2

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
03	ISSUED FOR CONSTRUCTION. ALL MAST NUMBERS REVISED. MASTS 1 BLO/ISC 33 AND 2 BLO/ISC 33 ADDED.	DD	CP	CP	2012-02-17
02	ISSUED FOR CONSTRUCTION. CLEARANCES REVISED	DEM	BS	CP	2019-08-19
01	ISSUED FOR CONSTRUCTION : • CO-ORDINATE TABLE ADDED; • NEW MAST NUMBERS ADDED WHERE APPLICABLE; & • HOLD CLOUD ADDED	KS	BS	CP	2018-05-08
00	ISSUED FOR CONSTRUCTION	KS	BS	CP	2018-04-16

This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

**CONTRACTOR / CONSULTANT**

TITLE	NAME	SIGN	DATE
DRAWN	DD	[Signature]	20 02 17
CHECKED	KS	[Signature]	20 02 17
DESIGNED	NM	[Signature]	20 02 17
CHECKED	CP	[Signature]	20 02 17

**TRANSNET CAPITAL PROJECTS**

TITLE	NAME	SIGN	DATE
<b>OPERATING DIVISIONS</b>			
<b>PR.ENG. / PR.TECH./PR. ARCH</b>			
NAME	CPYM	DATE	
SIGNATURE	[Signature]	20 02 17	
REG. NUMBER	201270126		
SCALE :	1 : 200		

**Transnet Capital Projects**





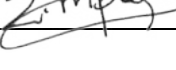
TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) : REG. NO. 1990/00090/06  
TABLE BAY BUILDING, TYGERBERG PARK,  
163 UYS KRIGE DRIVE, PLATTEKLOOF, 8001  
TEL: 021 940 1999  
FAX: 086 677 2455

**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE :  
66kV BRANCH LINE MAST POSITIONS  
& CLEARANCES**

PROJECT NUMBER	OD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
1 9 2 4 7 0 1	2	3 0 0	E	L A	0 0 6 2	0 1	0 3	AE

**SQUAD CHECK FORM**

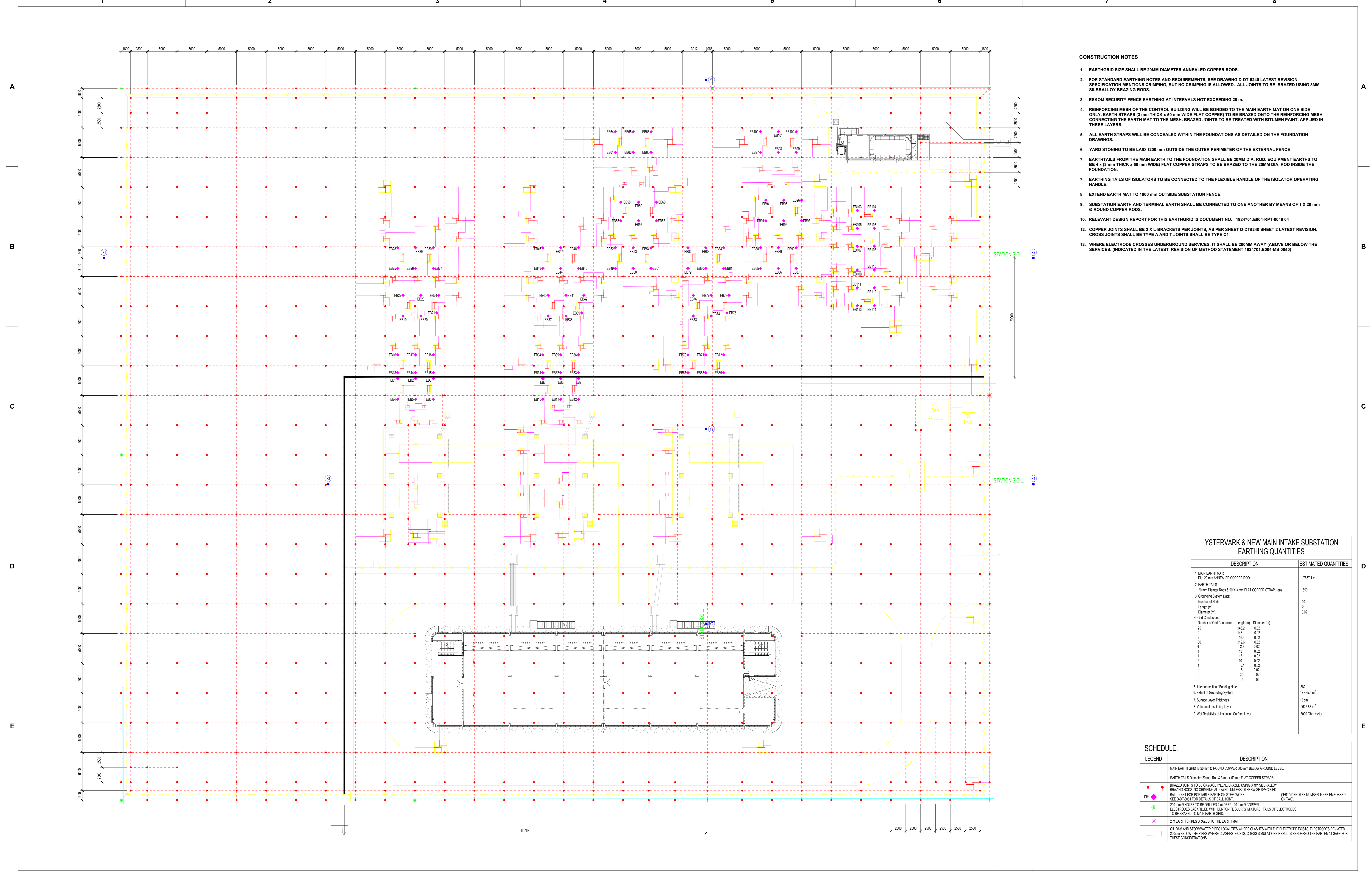
Location		<b>Saldanha</b>			Squad Check Number		<b>1924701.E004-SQ-0504</b>			
Title		<b>New MIS Earthmat Layout drawing</b>			Contract No.		<b>E004</b>			
Project Name		<b>Installation of the 3rd Tippler at the Port of Saldanha</b>			Project No.		<b>1924701</b>			
Document No.		<b>1924701-2-300-E-LA-0064-01</b>			Revision		<b>06</b>			
Discipline	Reviewer's Name	Reviewer's Signature	Date	Mandatory	Optional	Approved	Approved with Comments	Rejected	Information	
	Ian Liedtke			X						
	Ludaan Kohrs			X						
E	Amanda Marais		14/04/2020	X		X				
E	Bonga Ntshangase		15/04/2020	X		X				
	Colin Pym		14/04/2020	X		X				
	Ian Liedtke		08/04/2020			X				
E	Zukiswa Mpana		15/04/2020			X				
<b>REVIEW STATUS (Assigned by Responsible Project Manager)</b>										
C 1	<input type="checkbox"/>	APPROVED			C 3	<input type="checkbox"/>	REJECTED			
C 2	<input type="checkbox"/>	APPROVED WITH COMMENTS (REVISE & SUBMIT)			C 4	<input type="checkbox"/>	INFORMATION			
<b>SIGNED BY:</b>  <b>RESPONSIBLE PROJECT MANAGER</b>				Print Name						
				Signature						
				Date						
<i>This review is only for general conformance with the design concept of the Project and general compliance with the information given in the contract documents</i>										





**SQUAD CHECK COMMENT SHEET**

		Project / Contract No.	Squad Check No.	
		1924701-E004	1924701.E004-SQ-0504	
Comments	Name of Discipline	Action Taken by Responsible PM		
<p>Acceptance of the design and equipment in no way relieves the Contractor &amp; OEM of their obligation and responsibility to ensure that the design and equipment complies to the project and Eskom requirements and is "fit for purpose".</p>	Electrical			
	<p><b>SIGNED BY:</b>  <b>RESPONSIBLE PROJECT MANAGER</b></p>	Print Name		
		Signature		
Date				
<p><i>This comment sheet must always accompany the front cover sheet (Squad Check Form) once signed off</i></p>				



- CONSTRUCTION NOTES**
- EARTHGRID SIZE SHALL BE 20MM DIAMETER ANNEALED COPPER RODS.
  - FOR STANDARD EARTHING NOTES AND REQUIREMENTS, SEE DRAWING D-DT-5240 LATEST REVISION. SPECIFICATION MENTIONS CRIMPING, BUT NO CRIMPING IS ALLOWED. ALL JOINTS TO BE BRAZED USING 3MM SILBRALLOY BRAZING RODS.
  - ESKOM SECURITY FENCE EARTHING AT INTERVALS NOT EXCEEDING 20 m.
  - REINFORCING MESH OF THE CONTROL BUILDING WILL BE BONDED TO THE MAIN EARTH MAT ON ONE SIDE ONLY. EARTH STRAPS (3 mm THICK x 50 mm WIDE FLAT COPPER) TO BE BRAZED ONTO THE REINFORCING MESH CONNECTING THE EARTH MAT TO THE MESH. BRAZED JOINTS TO BE TREATED WITH BITUMEN PAINT, APPLIED IN THREE LAYERS.
  - ALL EARTH STRAPS WILL BE CONCEALED WITHIN THE FOUNDATIONS AS DETAILED ON THE FOUNDATION DRAWINGS.
  - YARD STONING TO BE LAID 1200 mm OUTSIDE THE OUTER PERIMETER OF THE EXTERNAL FENCE
  - EARTHTAILS FROM THE MAIN EARTH TO THE FOUNDATION SHALL BE 20MM DIA. ROD. EQUIPMENT EARTHS TO BE 4 x (3 mm THICK x 50 mm WIDE) FLAT COPPER STRAPS TO BE BRAZED TO THE 20MM DIA. ROD INSIDE THE FOUNDATION.
  - EARTHING TAILS OF ISOLATORS TO BE CONNECTED TO THE FLEXIBLE HANDLE OF THE ISOLATOR OPERATING HANDLE.
  - EXTEND EARTH MAT TO 1000 mm OUTSIDE SUBSTATION FENCE.
  - SUBSTATION EARTH AND TERMINAL EARTH SHALL BE CONNECTED TO ONE ANOTHER BY MEANS OF 1 X 20 mm Ø ROUND COPPER RODS.
  - RELEVANT DESIGN REPORT FOR THIS EARTHGRID IS DOCUMENT NO. : 1924701.E004-RPT-0048 04
  - COPPER JOINTS SHALL BE 2 X L-BRACKETS PER JOINTS, AS PER SHEET D-DT5240 SHEET 2 LATEST REVISION. CROSS JOINTS SHALL BE TYPE A AND T JOINTS SHALL BE TYPE C1
  - WHERE ELECTRODE CROSSES UNDERGROUND SERVICES, IT SHALL BE 200MM AWAY (ABOVE OR BELOW THE SERVICES. (INDICATED IN THE LATEST REVISION OF METHOD STATEMENT 1924701.E004-M5-0059)

**YSTERVARK & NEW MAIN INTAKE SUBSTATION EARTHING QUANTITIES**

DESCRIPTION	ESTIMATED QUANTITIES
1. MAIN EARTH MAT: Dia. 20 mm ANNEALED COPPER ROD.	7657.1 m
2. EARTH TAILS: 20 mm Diameter Rods & 50 X 3 mm FLAT COPPER STRAP (ea)	650
3. Grounding System Data: Number of Rods Length (m) Diameter (m)	10 2 0.02
4. Grid Conductors Number of Grid Conductors Length (m) Diameter (m)	25 146.2 0.02
5. Interconnection / Bonding Notes 6. Extent of Grounding System	882 17 485.5 m <sup>2</sup>
7. Surface Layer Thickness	15 cm
8. Volume of Insulating Layer	2622.83 m <sup>3</sup>
9. Wet Resistivity of Insulating Surface Layer	3000 Ohm-meter

**SCHEDULE:**

LEGEND	DESCRIPTION
---	MAIN EARTH GRID IS 20 mm Ø ROUND COPPER 600 mm BELOW GROUND LEVEL.
---	EARTH TAILS Diameter 20 mm Rod & 3 mm x 50 mm FLAT COPPER STRAPS.
•	BRAZED JOINTS TO BE OXY ACETYLENE BRAZED USING 3mm SILBRALLOY BRAZING RODS. NO CRIMPING ALLOWED, UNLESS OTHERWISE SPECIFIED.
•	BALL JOINT FOR PORTABLE EARTH ON STEELWORK. (E81) DENOTES NUMBER TO BE EMBOSSED ON TAG.
•	200 mm Ø HOLES TO BE DRILLED 2 m DEEP. 20 mm Ø COPPER ELECTRODES BACKFILLED WITH BENTONITE SLURRY MIXTURE. TAILS OF ELECTRODES TO BE BRAZED TO MAIN EARTH GRID.
•	2 m EARTH SPIKES BRAZED TO THE EARTH MAT.
---	OIL DAM AND STORMWATER PIPES LOCALITIES WHERE CLASHES WITH THE ELECTRODE EXISTS. ELECTRODES DEVIATED 250mm BELOW THE PIPES WHERE CLASHES EXISTS. CROSS SIMULATIONS RESULTS IS RENDERED THE EARTH MAT SAFE FOR THESE CONSIDERATIONS

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
06	EARTHTAILS AND NOTES UPDATED	SH	SH	WK	20-04-06
05	LINE WEIGHT CHANGED & NOTES ADDED	SH	SH	WK	20-03-12
04	DEVIATE ELECTRODE FROM STORMWATER PIPES	SH	SH	WK	20-03-05
03	EARTHTAILS AND NOTES UPDATED	SH	SH	WK	20-03-04
02	DEVIATE ELECTRODE FROM MANHOLES & OIL DAM	SH	SH	WK	20-02-20
01	ISSUED FOR CONSTRUCTION: • QUANTITIES UPDATED • NOTES CORRECTED AND ADDED.	SH	SH	WK	20-02-20
00	ISSUED FOR CONSTRUCTION	SH	SH	WK	20-02-20

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	S. Hamisi		20/02/20				
CHECKED	S. Hamisi		20/02/20				
DESIGNED	W. Kekana		20/02/20				
CHECKED	W. Kekana		20/02/20				
<b>OPERATING DIVISIONS</b>							
PRENG. / PR. TECH. / PR. ARCH							
SIGNATURE				DATE			
REG. NUMBER				20000215			
SCALE:				1:200 A0			

**TRANSNET CAPITAL PROJECTS**

TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) REG. NO. 1900000000  
 TABLE BAY BUILDING, TROGERBERG PARK,  
 163 UYS KRIGER DRIVE, PLATTEKLOOF, TEL: 021 940 1999  
 8001 FAX: 086 877 2455

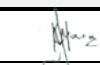
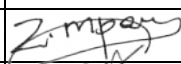


**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT**  
**BULK POWER UPGRADE**  
**NEW MAIN INTAKE SUBSTATION**  
**EARTH MAT LAYOUT**

PROJECT NUMBER	CD	WBS	DIS	DWG	NO.	SHEET	REV	ID
1924701	1	2	3	0	0	6	4	01-06



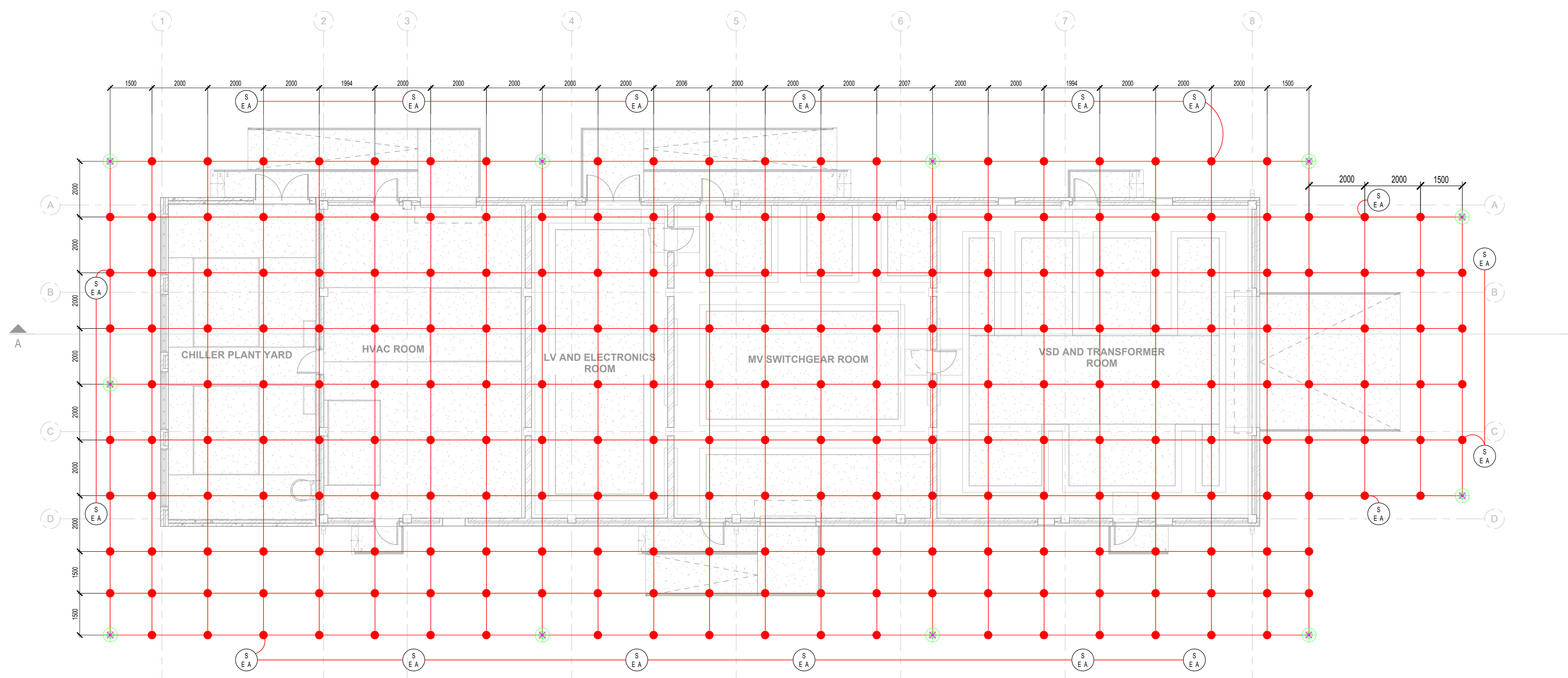
**SQUAD CHECK FORM**

Location		<b>Saldanha</b>		Squad Check Number		<b>1924701.E004-SQ-1383</b>			
Title		<b>Substation M Earthmat Layout</b>		Contract No.		<b>E004</b>			
Project Name		<b>Installation of the 3rd Tippler at the Port of Saldanha</b>		Project No.		<b>1924701</b>			
Document No.		<b>1924701-2-300-E-LA-0065-01</b>		Revision		<b>05</b>			
Discipline	Reviewer's Name	Reviewer's Signature	Date	Mandatory	Optional	Approved	Approved with Comments	Rejected	Information
E	Johann Wolmarans		09.09.21	X		X			
E	Bonga Ntshangase			X					
E	Zukiswa Mpana		10.09.2021	X			X		
E	Colin Pym		2021-09-10	X			X		
<b>REVIEW STATUS (Assigned by Responsible Project Manager)</b>									
C 1	<input type="checkbox"/>	APPROVED		C 3	<input type="checkbox"/>	REJECTED			
C 2	<input checked="" type="checkbox"/>	APPROVED WITH COMMENTS (REVISE & SUBMIT)		C 4	<input type="checkbox"/>	INFORMATION			
<b>SIGNED BY:</b>  <b>RESPONSIBLE PROJECT MANAGER</b>			Print Name	Richard Shandu					
			Signature						
			Date	10/09/2021					
<i>This review is only for general conformance with the design concept of the Project and general compliance with the information given in the contract documents</i>									

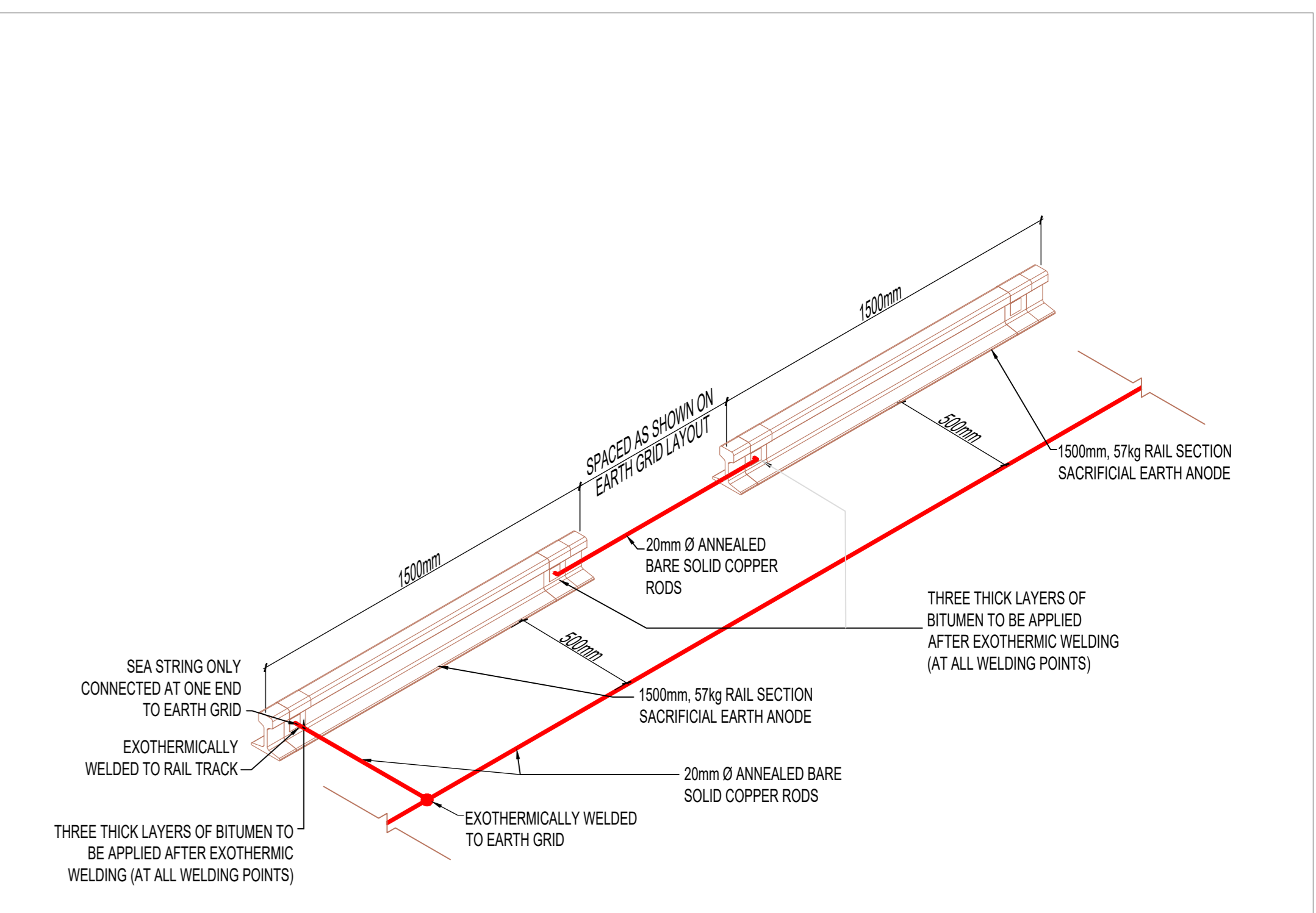


**SQUAD CHECK COMMENT SHEET**

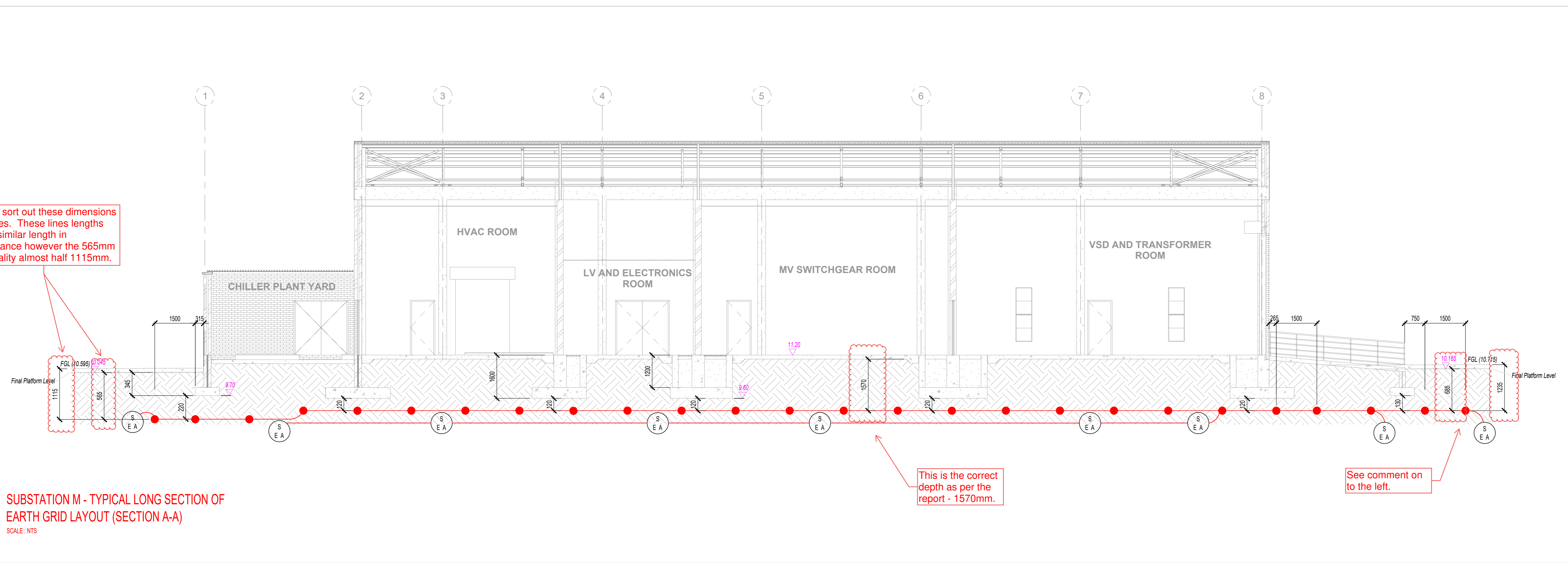
	Project / Contract No.	Squad Check No.
	1924701-E004	1924701.E004-SQ-1383
Comments	Name of Discipline	Action Taken by Responsible PM
Contractor must sort out the line lengths, the scale thereof of the reference levels depicting the burial depth of the earth mat.		
<b>SIGNED BY:</b>	Print Name	
<b>RESPONSIBLE PROJECT MANAGER</b>	Signature	
	Date	
	<i>This comment sheet must always accompany the front cover sheet (Squad Check Form) once signed off</i>	



SUBSTATION M - EARTH GRID LAYOUT  
SCALE: NTS



SACRIFICIAL EARTH ANODE INSTALLATION DETAIL - ISOMETRIC VIEW  
SCALE: NTS



Substation M - Typical Long Section of Earth Grid Layout (Section A-A)  
SCALE: NTS

DESCRIPTION	ESTIMATED QUANTITIES
1. MAIN EARTH MAT Dia. 20mm ANNEALED COPPER ROD	1047 m
2. EARTH TAILS 20 mm Diameter Rods & 50 X 3 mm FLAT COPPER STRAP (ea)	To be Quantified on site
3. Grounding System Data Number of Vertical Rods	11
Length (m)	2.4
Diameter (m)	0.02
4. Grid Conductors Number of Grid Conductors	29
Length (m)	18
Diameter (m)	0.02
5. Interconnection / Bonding Notes	250
6. Extent of Grounding System	799 m <sup>2</sup>
7. Surface Layer Thickness	15 cm
8. Volume of Insulating Layer	137.3 m <sup>3</sup>
9. Wet Resistivity of Insulating Surface Layer	3000 Ohm meter

LEGEND	DESCRIPTION
—	MAIN EARTH GRID IS 20 mm Ø ROUND COPPER
—	EXOTHERMIC WELDED JOINTS
⊙	SACRIFICIAL EARTH ANODE - 150mm, 57kg RAL TRACK
⊕	20 mm Ø HOLES TO BE DRILLED 2 m DEEP. 20 mm Ø COPPER ELECTRODES BACKFILLED WITH BENTONITE SLURRY MIXTURE. TAILS OF ELECTRODES TO BE EXOTHERMIC WELDED TO MAIN EARTH GRID
⊗	20 mm Ø EARTH RODS EXOTHERMIC WELDED TO THE EARTH MAT.

NOTES

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- THE MAIN EARTH GRID SHALL BE BURIED AT LEAST 600mm BELOW FINISHED GROUND LEVEL, WHERE PASSING UNDER FOUNDATIONS, CABLE TRENCHES, SLEEVES / OR DRAINS, THE EARTH GRID SHALL BE LAID 50mm BELOW THE RESPECTIVE INFRASTRUCTURE, UNLESS OTHERWISE SHOWN.
- THE ENTIRE EARTH GRID AND ASSOCIATED EARTH SYSTEM SHALL ONLY BE EXOTHERMICALLY WELDED AT ALL JOINTS, INTERSECTIONS AND TERMINATIONS, ETC., UNLESS SPECIFIED OTHERWISE. ALL WELDS SHALL BE OF SUCH A QUANTITY AS TO PREVENT ANY GALVANIC CORROSION INTERACTION
- WHERE THE EARTH GRID IS NOT DIMENSIONED, IT IS TO BE PLACED 120mm AWAY FROM THE FOUNDATIONS.
- ALL SPECIFIC EARTHING REQUIREMENTS SHALL BE AS CONTAINED IN THE EARTHING & LIGHTNING PROTECTION SYSTEM ARRANGEMENT DETAIL DRAWING(S) AND TECHNICAL SPECIFICATIONS.
- THE EMPLOYER SHALL WITNESS & INSPECT ALL INSTALLED EARTHING & LIGHTNING PROTECTION SYSTEM EQUIPMENT.
- NO EARTHING & LIGHTNING PROTECTION SYSTEM EQUIPMENT SHALL BE COVERED BEFORE APPROVAL FROM THE EMPLOYER HAS BEEN FURNISHED.
- FINAL RESISTANCE VALUES TO BE LESS THAN 1Ω, MEASURED DURING DRY & LOW MOISTURE CONDITIONS.
- FINAL GROUND LEVEL
- RELEVANT DESIGN REPORT FOR THIS EARTHGRID IS DOCUMENT NO. : 1924701.E004-RPT-0048 04

THENGA HOLDINGS,  
NELLMAPIUS DR, IRENE,  
CENTURION, 0062  
TEL: +27 (0) 11 312 5551  
FAX: +27 (0) 86 233 8051

UNIT 13, MIDWAY INDUSTRIAL  
PARK  
C/O SAMRAND AVENUE &  
COLOU FRANCOUIN STREET  
KOSMOSDAL  
CENTURION, 0157  
TEL: +27 (0) 11 312 5551  
FAX: +27 (0) 86 233 8051

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
05	LENGTH OF EARTH RODS AMENDED TO 2.4 m	GP	LAM	LAM	21-09-08
04	REMOVED 2 EARTH MAT LINES ON TOP	GP	LAM	LAM	21-08-23
03	CORRECTED DIMENSIONS OUTSIDE THE BUILDING	SH	MT	WK	20-11-23
02	INCLUDE REFERENCED DOCUMENTS	SH	MT	WK	20-09-25
01	VERIFY DIMENSIONS & CORRECT SPELLING	SH	MT	WK	20-07-29
00	ISSUED FOR CONSTRUCTION	SH	SH	WK	20-07-10

CONTRACTOR / CONSULTANT				TRANSET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	G. Piroso		21 09 08	DRAWN			
CHECKED	L.A. Mahole		21 09 08	CHECKED			
DESIGNED	L.A. Mahole		21 09 08	DESIGNED			
				CHECKED			

TRANSNET LTD (TRADING AS TRANSET CAPITAL PROJECTS) REG. NO. 190000000000  
TABLE VIEW BUILDINGS, TROGERBERG PARK,  
103 UYS KRIGE DRIVE, PLATTEKLOOF,  
8001 TEL: 021 940 1999  
FAX: 086 677 2455

**PORT OF SALDANHA**

IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE:  
SUBSTATION M  
EARTH MAT LAYOUT

DRAWING NO.	REFERENCE
1924701.E004-RPT-0064	Detailed Earth Electrode Design of Substation M (Latest Revision)
1924701-3-300-E-SP-0008	Technical Specification Tippler 3 Bulk Power Supply-LV Installations (Latest Revision)
SANS 62365-1-2011	Protection against lightning - ALL Parts
SANS 10315-2:2018	Protection against lightning - Physical damage to structures and life hazard
SANS 10405-2:2017	Electrical installations and earthing in hazardous areas
SANS 1063	Earth rods, couplers and connections
SANS 10199-2:2016	The design and installation of earth electrodes



## SQUAD CHECK FORM

Location	<b>Saldanha</b>			Squad Check Number	<b>1924701.E004-SQ-1913</b>				
Title	<b>Substation N EARTH GRID LAYOUT</b>			Contract No.	<b>E004</b>				
Project Name	<b>Installation of the 3rd Tippler at the Port of Saldanha</b>			Project No.	<b>1924701</b>				
Document No.	<b>1924701-2-300-E-LA-0083-01</b>			Revision	<b>01</b>				
Discipline	Reviewer's Name	Reviewer's Signature	Date	Mandatory	Optional	Approved	Approved with Comments	Rejected	Information
E	Colin Pym		2023-04-18	X		X			
E	Bonga Ntshangase		18/04/2023	X		X			
E	Zukiswa Mpana		18/04/2023	X					X
<b>REVIEW STATUS (Assigned by Responsible Project Manager)</b>									
C 1	<input type="checkbox"/>	APPROVED		C 3	<input type="checkbox"/>	REJECTED			
C 2	<input type="checkbox"/>	APPROVED WITH COMMENTS (REVISE & SUBMIT)		C 4	<input type="checkbox"/>	INFORMATION			
<b>SIGNED BY:</b>  <b>RESPONSIBLE PROJECT MANAGER</b>				Print Name	<b>Lineo Masepe</b>				
				Signature					
				Date					
<i>This review is only for general conformance with the design concept of the Project and general compliance with the information given in the contract documents</i>									

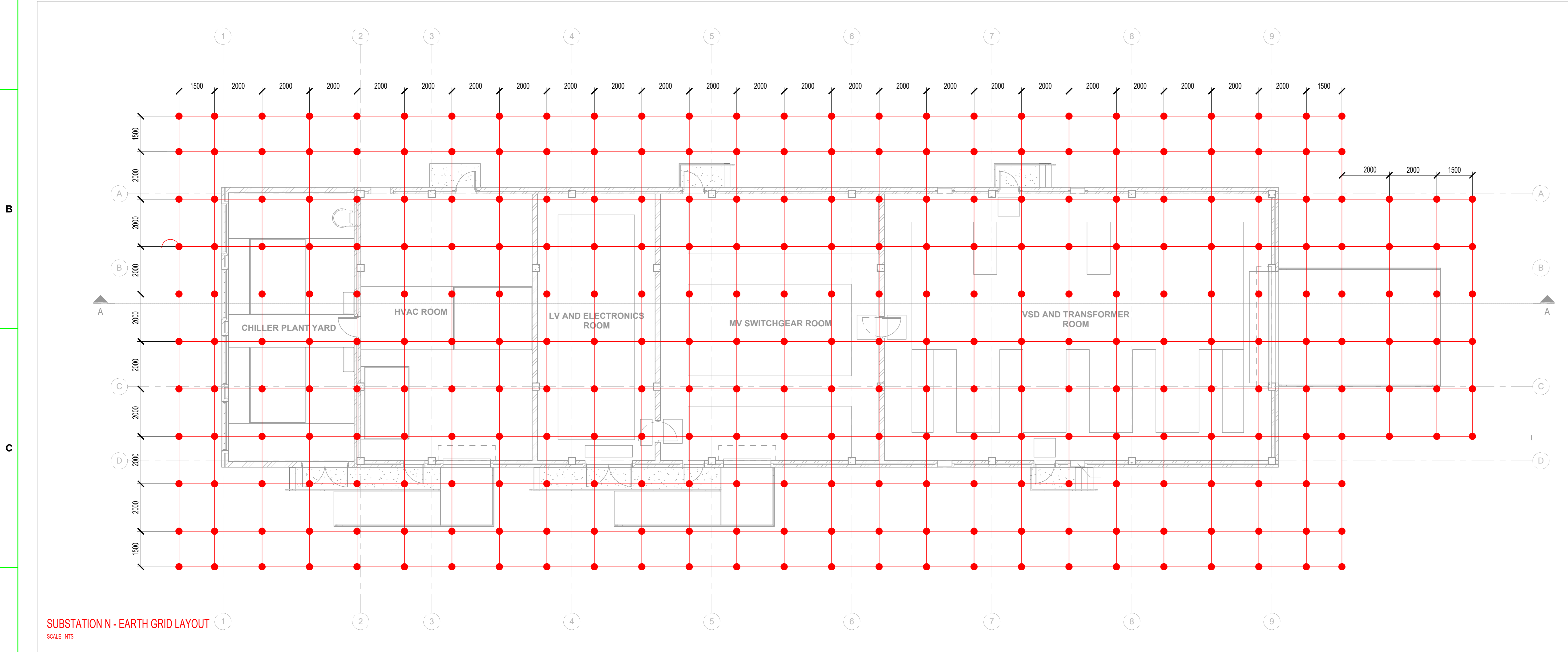


SQUAD CHECK COMMENT SHEET

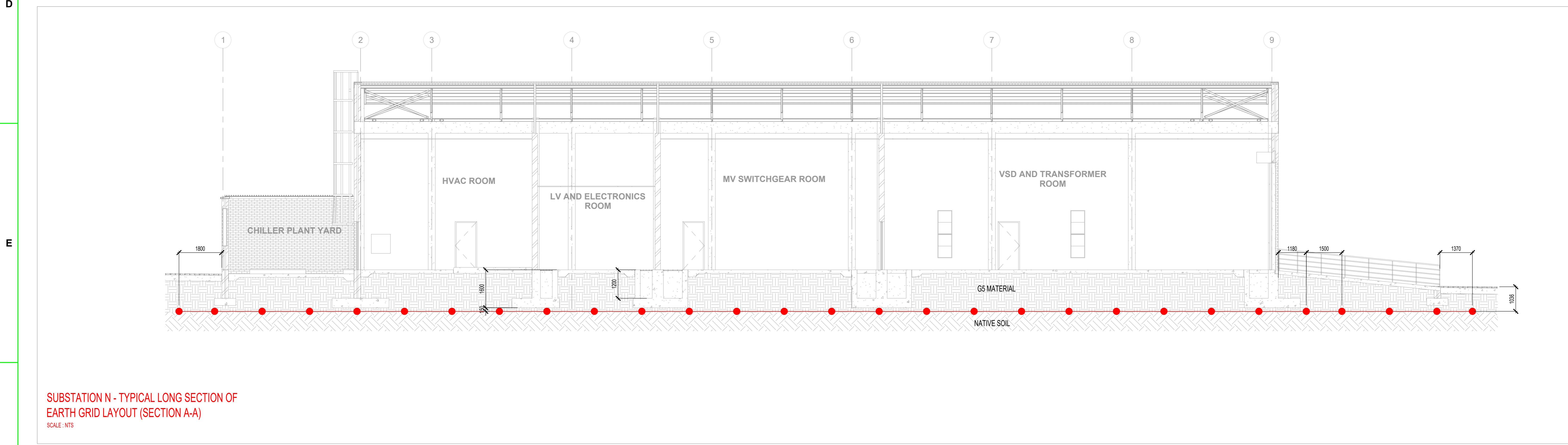
		Project / Contract No.	Squad Check No.
		1924701-E004	1924701.E004-SQ-1913
Comments	Name of Discipline	Action Taken by Responsible PM	
Notes: The designer should improve on the drawing information. This drawing is lacking with construction notes and referencing			
SIGNED BY:  RESPONSIBLE PROJECT MANAGER		Print Name	
		Signature	
		Date	
This comment sheet must always accompany the front cover sheet (Squad Check Form) once signed off			

**LEGEND:**

- MAIN EARTH GRID - 20mm Ø SOLID COPPER ROUND CONDUCTOR  
BRAZED AT ALL JUNCTIONS & INTERSECTIONS INSTALLED 150mm BELOW FOUNDATIONS
- BRAZED JOINTS



**SUBSTATION N - EARTH GRID LAYOUT**  
SCALE: NTS



**SUBSTATION N - TYPICAL LONG SECTION OF EARTH GRID LAYOUT (SECTION A-A)**  
SCALE: NTS

**NOTES**

DRAWING NO.	REFERENCE

**REFERENCE DRAWINGS**

1

2

3

4

5

6

7

8

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	INSERT MEASUREMENTS	SD	MH	GP	2023-04-14
00	ISSUED FOR CONSTRUCTION	SD	MH	GP	2023-04-03

**REVISIONS**

This Document including all design and information therein is Confidential Intellectual Property of Transnet.  
Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

TITLE	NAME	SIGN	DATE
CONTRACTOR / CONSULTANT	NAME	SIGN	DATE
DRAWN	SWR		23/04/14
CHECKED	MH		23/04/14
DESIGNED	GP		23/04/14
CHECKED	MH		23/04/14

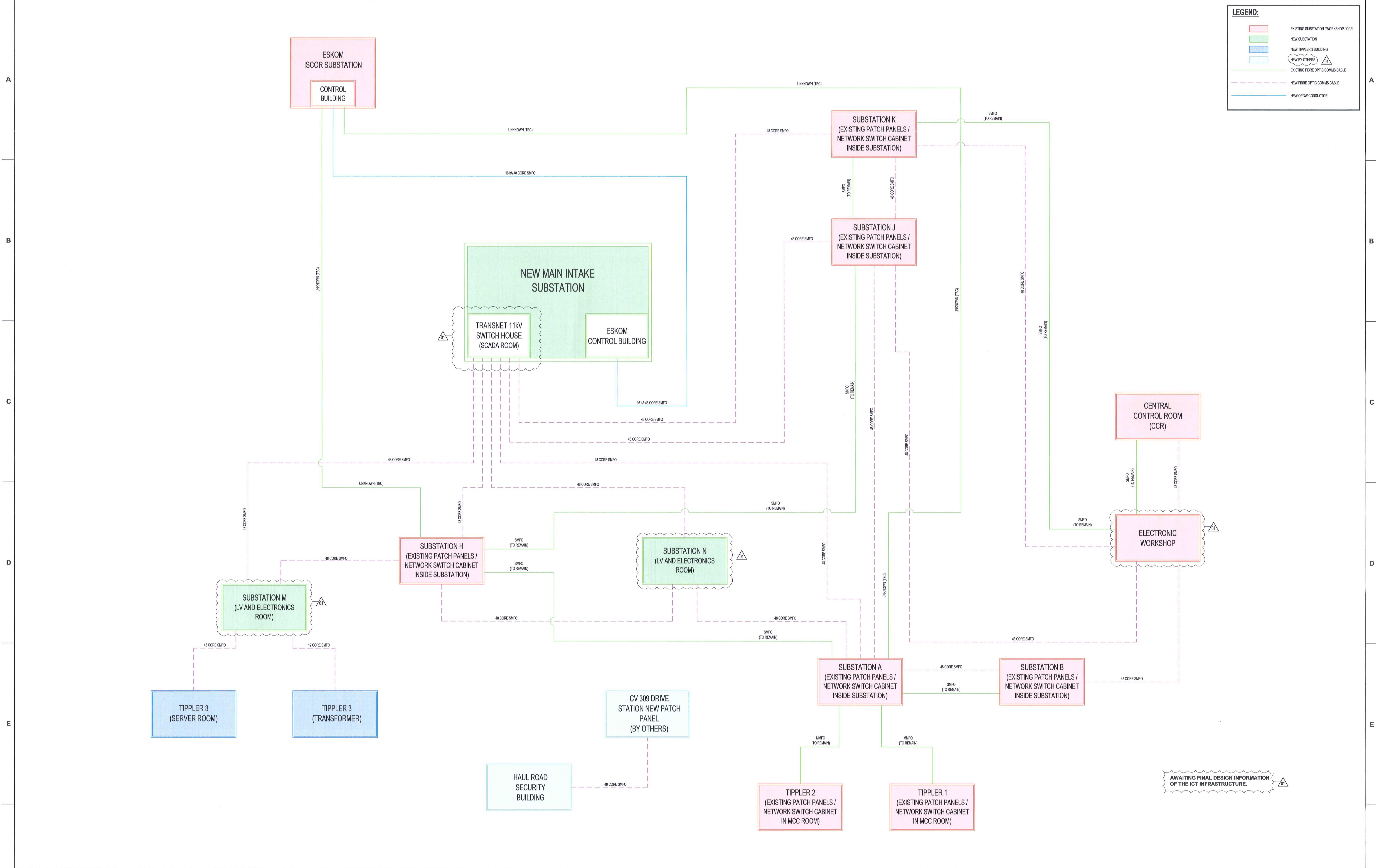
TITLE	NAME	SIGN	DATE
OPERATING DIVISIONS			
PR. ENG. / PR. TECH. / PR. ARCH			
NAME	G.PENCE		23/04/14
SIGNATURE	<i>G.Pence</i>		
REG. NUMBER	2023000403		
SCALE:	NTS		

**Thenga**  
Holdings (Pty) Ltd  
PORT OF SALDANHA

IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE:  
SUBSTATION N  
EARTH GRID LAYOUT

PROJECT NUMBER	DD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID														
AO	19	2	4	7	0	1	2	3	0	0	E	L	A	0	0	8	3	0	1	0	1	SES





**LEGEND:**

[Pink Box]	EXISTING SUBSTATION / WORKSHOP / CCR
[Green Box]	NEW SUBSTATION
[Blue Box]	NEW TIPPLER 3 BUILDING
[Light Blue Box]	NEW BY OTHERS
[Green Line]	EXISTING FIBRE OPTIC COMMS CABLE
[Dashed Green Line]	NEW FIBRE OPTIC COMMS CABLE
[Blue Line]	NEW OPGW CONDUCTOR

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

- NOTES**
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - SMFO = SINGLE MODE FIBRE OPTIC
  - MMFO = MULTI-MODE FIBRE OPTIC
  - OPGW = OPTICAL GROUND WIRE
  - FINAL CONNECTION POINT(S) AT ISCOR SUBSTATION TO BE CONFIRMED.
  - EXISTING FIBRE OPTIC CABLES FROM ISCOR SUBSTATION TO SUBSTATIONS A & H RESPECTIVELY TO BE CONFIRMED.
  - NEW FIBRE OPTIC CABLES TO BE OF THE ARMOURD TYPE.

**MASTER**  
07 JUN 2018

**AECOM**      **TRANSNET**

**CAPE TOWN OFFICE**  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No.: 1954/006628/07

**ISSUED FOR CONSTRUCTION:**

- HOLD POINT ADDED.
- TRANSNET 11 kV SWITCH HOUSE ROOM CHANGED.
- SUBSTATION M ROOM CHANGED.
- SUBSTATION N ROOM CHANGED.
- ELECTRONIC WORKSHOP WAS ELECTRONICS WORKSHOP.

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION	GB	DA	CP	18-06-06
02	ISSUED FOR CONSTRUCTION	GB	DA	CP	18-03-16

**REVISIONS**

This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	GB		18 06 06
				CHECKED	JF		18 06 06
				DESIGNED	BS		18 06 06
				CHECKED	DA		18 06 06
OPERATING DIVISIONS				PR. ENG. / PR. TECH. / PR. ARCH			
TITLE	NAME	SIGN	DATE	NAME	CPYM	DATE	
				SIGNATURE		18 06 06	
REG. NUMBER	201270126			SCALE:	NTS		

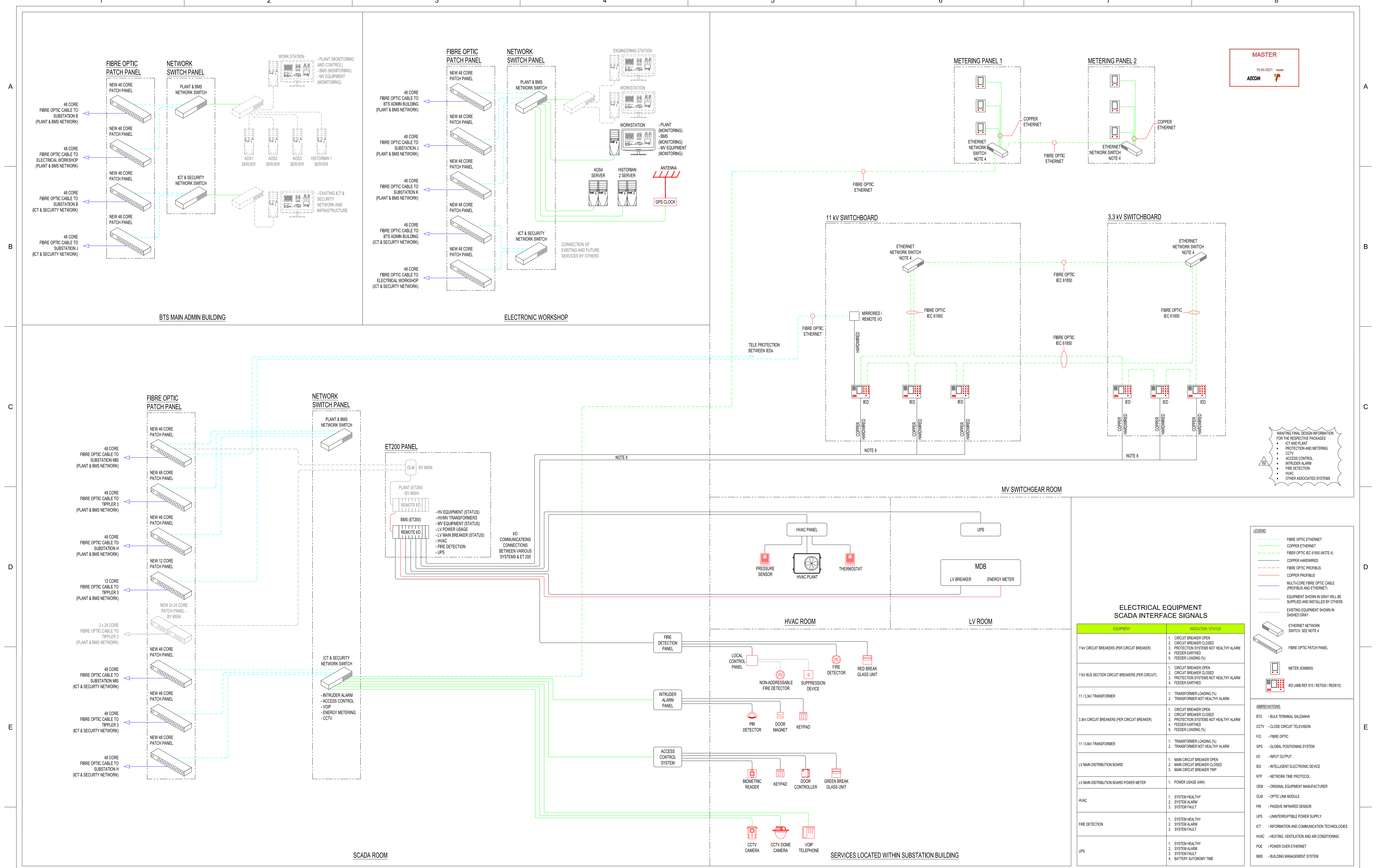
**Transnet Capital Projects**

TRANSNET LTD (TRANSNET AS TRANSNET CAPITAL PROJECTS) REG. NO. 199080000  
TABLE BAY BUILDING, TYGERBERG PARK TEL: 021 940 1000  
161 TYGERBERG DRIVE, PLATTENBERG, 7401 FAX: 021 940 2455

**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT**  
BULK POWER UPGRADE:  
FIBRE OPTIC BLOCK DIAGRAM

PROJECT NUMBER	001	FIBS	001	DISE	001	DRAWING NO.	001	SHEET	01	REV	01	AE
----------------	-----	------	-----	------	-----	-------------	-----	-------	----	-----	----	----



**MASTER**  
15-04-2021  
AECOM

AWAITING FINAL DESIGN INFORMATION FOR THE RESPECTIVE PACKAGES:  
 • ICT AND PLAN  
 • PROTECTION AND METERING  
 • CCTV  
 • ACCESS CONTROL  
 • INTRUDER ALARM  
 • FIRE DETECTION  
 • HVAC  
 • OTHER ASSOCIATED SYSTEMS

**LEGEND:**  
 - FIBRE OPTIC ETHERNET  
 - COPPER ETHERNET  
 - FIBRE OPTIC IEC 61850 (NOTE 4)  
 - COPPER HARDWIRED  
 - FIBRE OPTIC PROFIBUS  
 - COPPER PROFIBUS  
 - MULTICORE FIBRE OPTIC CABLE (PROFIBUS AND ETHERNET)  
 - EQUIPMENT SHOWN IN GRAY WILL BE SUPPLIED AND INSTALLED BY OTHERS  
 - EXISTING EQUIPMENT SHOWN IN DASHED GRAY

ETHERNET NETWORK SWITCH NOTE 4  
 FIBRE OPTIC PATCH PANEL  
 METER (JON8000)  
 IED (ABB REF 615 / RET100 / RED415)

**ABBREVIATIONS:**  
 BTS - BULK TERMINAL SALDANHA  
 CCTV - CLOSE CIRCUIT TELEVISION  
 FIO - FIBRE OPTIC  
 GPS - GLOBAL POSITIONING SYSTEM  
 IO - INPUT OUTPUT  
 IED - INTELLIGENT ELECTRONIC DEVICE  
 NTP - NETWORK TIME PROTOCOL  
 OEM - ORIGINAL EQUIPMENT MANUFACTURER  
 OLM - OPTIC LINK MODULE  
 PIR - PASSIVE INFRARED SENSOR  
 UPS - UNINTERRUPTIBLE POWER SUPPLY  
 ICT - INFORMATION AND COMMUNICATION TECHNOLOGIES  
 HVAC - HEATING, VENTILATION AND AIR CONDITIONING  
 POE - POWER OVER ETHERNET  
 BMS - BUILDING MANAGEMENT SYSTEM

EQUIPMENT	INDICATION / STATUS
11KV CIRCUIT BREAKERS (PER CIRCUIT BREAKER)	1. CIRCUIT BREAKER OPEN 2. CIRCUIT BREAKER CLOSED 3. PROTECTION SYSTEMS NOT HEALTHY ALARM 4. FEEDER EARTHED 5. FEEDER LOADING (%)
11KV BUS SECTION CIRCUIT BREAKERS (PER CIRCUIT)	1. CIRCUIT BREAKER OPEN 2. CIRCUIT BREAKER CLOSED 3. PROTECTION SYSTEMS NOT HEALTHY ALARM 4. FEEDER EARTHED 5. FEEDER LOADING (%)
11/13.8KV TRANSFORMER	1. TRANSFORMER LOADING (%) 2. TRANSFORMER NOT HEALTHY ALARM
3.3KV CIRCUIT BREAKERS (PER CIRCUIT BREAKER)	1. CIRCUIT BREAKER OPEN 2. CIRCUIT BREAKER CLOSED 3. PROTECTION SYSTEMS NOT HEALTHY ALARM 4. FEEDER EARTHED 5. FEEDER LOADING (%)
11/10.4KV TRANSFORMER	1. TRANSFORMER LOADING (%) 2. TRANSFORMER NOT HEALTHY ALARM
LV MAIN DISTRIBUTION BOARD	1. MAIN CIRCUIT BREAKER OPEN 2. MAIN CIRCUIT BREAKER CLOSED 3. MAIN CIRCUIT BREAKER TRIP
LV MAIN DISTRIBUTION BOARD POWER METER	1. POWER USAGE (WH)
HVAC	1. SYSTEM HEALTHY 2. SYSTEM ALARM 3. SYSTEM FAULT
FIRE DETECTION	1. SYSTEM HEALTHY 2. SYSTEM ALARM 3. SYSTEM FAULT
UPS	1. SYSTEM HEALTHY 2. SYSTEM ALARM 3. SYSTEM FAULT 4. BATTERY AUTONOMY TIME

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

- NOTES**
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - CONTRACTOR TO REFER TO PROTECTION DRAWINGS FOR FURTHER DETAIL AND INFORMATION ON THE PROTECTION INFRASTRUCTURE.
  - LAYER 3 SWITCHES.
  - THE CONTRACTOR SHALL WORK IN CLOSE COOPERATION WITH ALL OTHER APPLICABLE CONTRACTORS.
  - REFER TO THE LATEST REVISION OF 1924701-2-300-E-SP-0010 FOR DETAILED INFORMATION REGARDING THE HARDWIRED SIGNALS REQUIRED TO BE CONNECTED TO THE ET200 FOR REMOTE INDICATION TO SCADA.
  - THIS IS A CONCEPT ONLY TO INDICATE CONNECTION & LOOPING PHILOSOPHY BETWEEN IEDS. PLEASE REFER TO 1924701-2-300-E-SD-0003-01-01 FOR DETAILS.
  - THE CONTRACTOR MUST CONFIRM & OBTAIN APPROVAL FOR ALL EQUIPMENT LOCATIONS (EXISTING & NEW) BEFORE INSTALLATION CAN COMMENCE.

THIS DRAWING WAS UPDATED AS LISTED BELOW:  
 • FIBRE NETWORK SPLIT INTO TWO SEPARATE NETWORKS (1 - PROCESS PLANT AND 2 - ICT & SECURITY).  
 • EQUIPMENT INDICATION STATUS TABLE ADDED.  
 • INDICATING IED INFORMATION TO BE AVAILABLE AND TRANSFERRED TO THE NETWORK.  
 • NOTES 6, 7 & 8 ADDED.  
 • HOLD POINTS ADDED.

**AECOM**  
 CAPE TOWN OFFICE  
 WATERLOO PLACE, SOUTH GATE  
 TYGER WATERFRONT  
 CARL CRONJE DRIVE  
 TEL: +27 (0)21 950 7500  
 TEL: +27 (0)21 950 7502  
 FAX: +27 (0)21 950 7502  
 REG. NO. 1966/006628/07

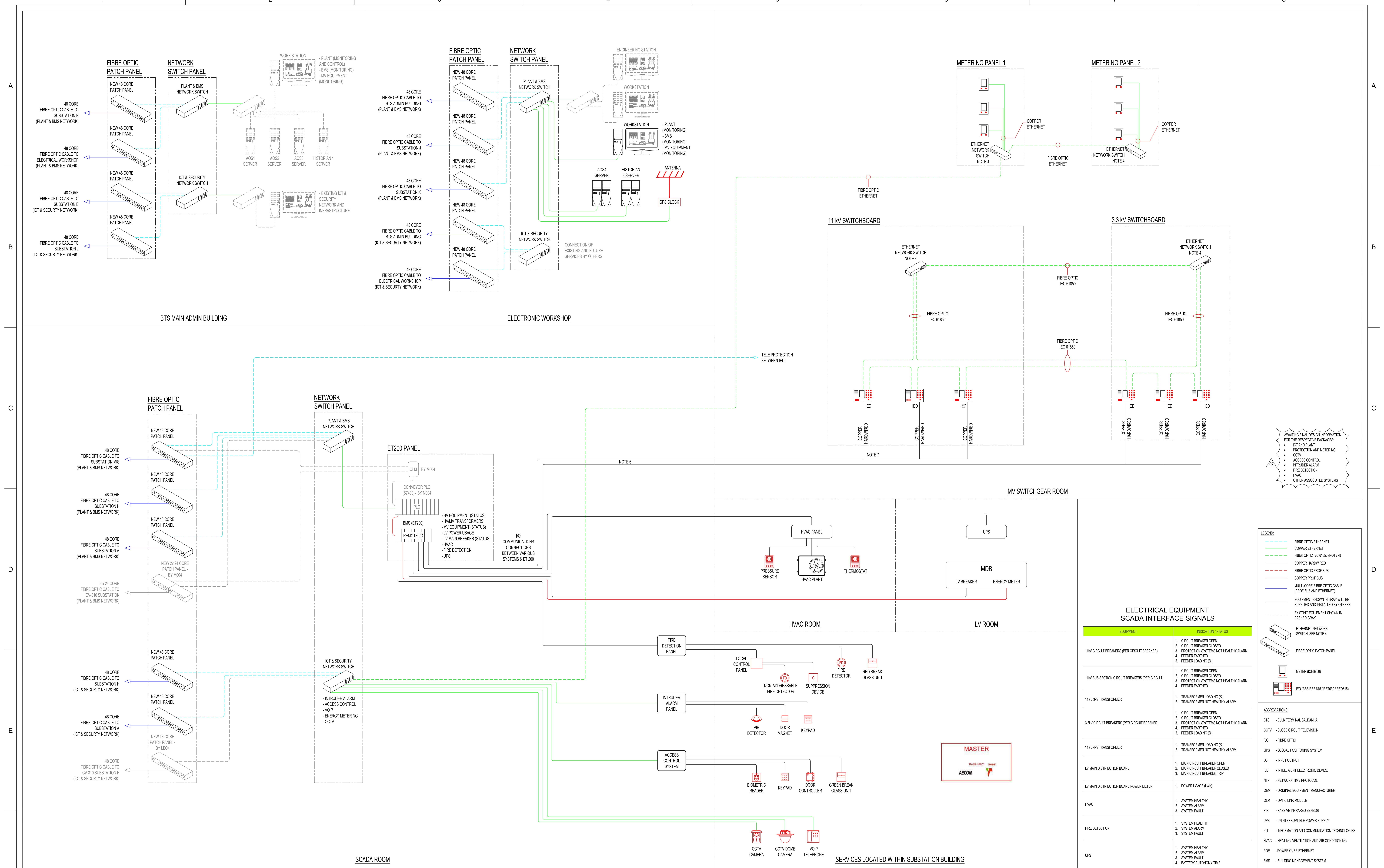
NO.	DESCRIPTION	BY	CHKD	APPD	DATE
02	ISSUED FOR CONSTRUCTION	KS	LB	CP	2020-10-08
	UPDATED FOR NEW CLIENT REQUIREMENTS				

CONTRACTOR / CONSULTANT				TRANSMET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
DRAWN	KS	[Signature]	20/10/08				
CHECKED	DD	[Signature]	20/10/08				
DESIGNED	LD	[Signature]	20/10/08				
CHECKED	CP	[Signature]	20/10/08				

**TRANSNET CAPITAL PROJECTS**  
 TRANSNET LTD (PROVING AS TRANSNET CAPITAL PROJECTS) REG. NO. 19900000000  
 TABLE BAY BUILDINGS, TYGERSBERG PARK  
 163 LUYSKRIGER DRIVE, PLATTEKLOOF, 7530  
 TEL: 021 940 1999  
 FAX: 021 940 2455

**IRON ORE TIPPLER 3 PROJECT**  
**BULK POWER UPGRADE**  
**SUBSTATION M**  
**MONITORING AND CONTROL BLOCK DIAGRAM**

PROJECT NUMBER: 201270126  
 SHEET: 1 OF 2  
 DATE: 21/04/16



DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

- NOTES**
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - CONTRACTOR TO REFER TO PROTECTION DRAWINGS FOR FURTHER DETAIL AND INFORMATION ON THE PROTECTION INFRASTRUCTURE.
  - LAYER 3 SWITCHES.
  - THE CONTRACTOR SHALL WORK IN CLOSE COOPERATION WITH ALL OTHER APPLICABLE CONTRACTORS.

- REFER TO THE LATEST REVISION OF 1924701-2-300-E-SP-0010 FOR DETAILED INFORMATION REGARDING THE HARDWIRED SIGNALS REQUIRED TO BE CONNECTED TO THE ET200 FOR REMOTE INDICATION TO SCADA.
- THIS IS A CONCEPT ONLY TO INDICATE CONNECTION & LOOPING PHILOSOPHY BETWEEN IEDs. PLEASE REFER TO 1924701-2-300-E-SD-0004-01-01 FOR DETAILS.
- THE CONTRACTOR MUST CONFIRM & OBTAIN APPROVAL FOR ALL EQUIPMENT LOCATIONS (EXISTING & NEW) BEFORE INSTALLATION CAN COMMENCE.

THIS DRAWING WAS UPDATED AS LISTED BELOW:

- FIBRE NETWORK SPLIT INTO TWO SEPARATE NETWORKS (1 - PROCESS PLANT AND 2 - ICT & SECURITY).
- EQUIPMENT INDICATION STATUS TABLE ADDED, INDICATING I/O INFORMATION TO BE AVAILABLE AND TRANSFERRED TO THE NETWORK.
- NOTES 6, 7 & 8 ADDED.
- HOLD POINTS ADDED.

**AECOM**

CAPE TOWN OFFICE  
 WATERSIDE PLACE, SOUTH GATE  
 TYGER WATERFRONT  
 CARL GROENE DRIVE  
 TEL: +27 (0)21 950 7500  
 FAX: +27 (0)21 950 7502  
 REG. NO. 1966/006628/07

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	DATE	TITLE	DATE
DRAWN	20/10/08	NAME	DATE
CHECKED	20/10/08	NAME	DATE
DESIGNED	20/10/08	NAME	DATE
CHECKED	20/10/08	NAME	DATE

OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	
TITLE	DATE	NAME	DATE
ISSUED FOR CONSTRUCTION	2020-10-08	NAME	DATE
UPDATED FOR NEW CLIENT REQUIREMENTS		NAME	DATE
DESCRIPTION		SIGNATURE	21/04/16
REG. NUMBER	2019/0126	REG. NUMBER	2019/0126
SCALE:	NTS	SCALE:	NTS

**TRANSNET**

Transnet Capital Projects

153 UYS KRIGER DRIVE, PLATTENKLOOF, 8001

**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT**

**BULK POWER UPGRADE:**

**SUBSTATION N**

**MONITORING AND CONTROL BLOCK DIAGRAM**

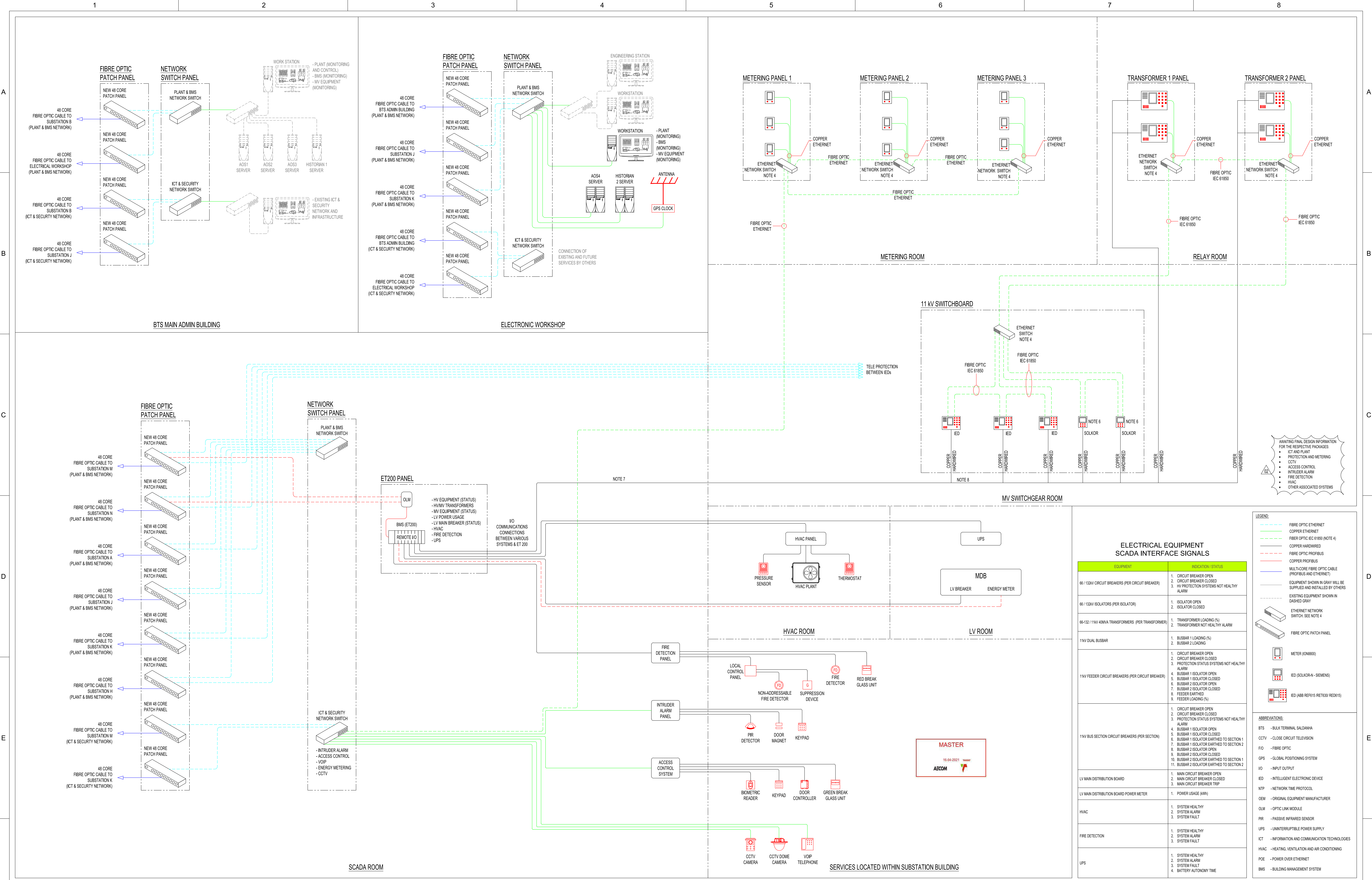
PROJECT NUMBER: AO191247012-300E-PD-0004-01-02

**ELECTRICAL EQUIPMENT SCADA INTERFACE SIGNALS**

EQUIPMENT	INDICATION / STATUS
11KV CIRCUIT BREAKERS (PER CIRCUIT BREAKER)	1. CIRCUIT BREAKER OPEN 2. CIRCUIT BREAKER CLOSED 3. PROTECTION SYSTEMS NOT HEALTHY ALARM 4. FEEDER EARTHED 5. FEEDER LOADING (%)
11KV BUS SECTION CIRCUIT BREAKERS (PER CIRCUIT)	1. CIRCUIT BREAKER OPEN 2. CIRCUIT BREAKER CLOSED 3. PROTECTION SYSTEMS NOT HEALTHY ALARM 4. FEEDER EARTHED 5. FEEDER LOADING (%)
11/3.3KV TRANSFORMER	1. TRANSFORMER LOADING (%) 2. TRANSFORMER NOT HEALTHY ALARM
3.3KV CIRCUIT BREAKERS (PER CIRCUIT BREAKER)	1. CIRCUIT BREAKER OPEN 2. CIRCUIT BREAKER CLOSED 3. PROTECTION SYSTEMS NOT HEALTHY ALARM 4. FEEDER EARTHED 5. FEEDER LOADING (%)
11/0.4KV TRANSFORMER	1. TRANSFORMER LOADING (%) 2. TRANSFORMER NOT HEALTHY ALARM
LV MAIN DISTRIBUTION BOARD	1. MAIN CIRCUIT BREAKER OPEN 2. MAIN CIRCUIT BREAKER CLOSED 3. MAIN CIRCUIT BREAKER TRIP
LV MAIN DISTRIBUTION BOARD POWER METER	1. POWER USAGE (KW)
HVAC	1. SYSTEM HEALTHY 2. SYSTEM ALARM 3. SYSTEM FAULT
FIRE DETECTION	1. SYSTEM HEALTHY 2. SYSTEM ALARM 3. SYSTEM FAULT
UPS	1. SYSTEM HEALTHY 2. SYSTEM ALARM 3. SYSTEM FAULT 4. BATTERY AUTONOMY/TIME

- LEGEND**
- FIBRE OPTIC ETHERNET
  - COPPER ETHERNET
  - FIBER OPTIC IEC 61850 (NOTE 4)
  - COPPER HARDWIRED
  - FIBRE OPTIC PROFIBUS
  - COPPER PROFIBUS
  - MULTI-CORE FIBRE OPTIC CABLE (PROFIBUS AND ETHERNET)
  - EQUIPMENT SHOWN IN GRAY WILL BE SUPPLIED AND INSTALLED BY OTHERS
  - EXISTING EQUIPMENT SHOWN IN DASHED GRAY
  - ETHERNET NETWORK SWITCH (SEE NOTE 4)
  - FIBRE OPTIC PATCH PANEL
  - METER (JON800)
  - IED (ABB REF 615 / RET130 / RED15)

- ABBREVIATIONS**
- BTS - BULK TERMINAL SALDANHA
  - CCTV - CLOSE CIRCUIT TELEVISION
  - FIO - FIBRE OPTIC
  - GPS - GLOBAL POSITIONING SYSTEM
  - IO - INPUT OUTPUT
  - IED - INTELLIGENT ELECTRONIC DEVICE
  - NET - NETWORK TIME PROTOCOL
  - OEM - ORIGINAL EQUIPMENT MANUFACTURER
  - OLM - OPTIC LINK MODULE
  - PIR - PASSIVE INFRARED SENSOR
  - UPS - UNINTERRUPTIBLE POWER SUPPLY
  - ICT - INFORMATION AND COMMUNICATION TECHNOLOGIES
  - HVAC - HEATING, VENTILATION AND AIR CONDITIONING
  - POE - POWER OVER ETHERNET
  - BMS - BUILDING MANAGEMENT SYSTEM



DRAWING NO.	REFERENCE
1	
2	
3	
4	
5	
6	
7	
8	

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- CONTRACTOR TO REFER TO PROTECTION DRAWINGS FOR FURTHER DETAIL AND INFORMATION ON THE PROTECTION INFRASTRUCTURE.
- LAYER 3 SWITCHES.
- THE CONTRACTOR SHALL WORK IN CLOSE COOPERATION WITH ALL OTHER APPLICABLE CONTRACTORS.

6. REMOTE CB STATUS FOR SUBSTATIONS A, H, J & K REQUIRED AS HARDWIRED SIGNAL INTO LOCAL ET200. SHOULD IT NOT BE POSSIBLE TO MAP REMOTE STATUS TO LOCAL IED VIA IEC61850 / BINARY OUTPUTS / OTHER INTERNAL COMMS, EXTERNAL REMOTE / MIRRORRED IO DEVICES MIGHT BE REQUIRED.

7. REFER TO THE LATEST REVISION OF 1924701-2-300-E-SP-0010 FOR DETAILED INFORMATION REGARDING THE HARDWIRED SIGNALS REQUIRED TO BE CONNECTED TO THE ET200 FOR REMOTE INDICATION TO SCADA.

8. THIS IS A CONCEPT ONLY TO INDICATE CONNECTION & LOOPING PHILOSOPHY BETWEEN IEDs. PLEASE REFER TO 1924701-2-300-E-SD-0009-01-01 FOR DETAILS.

9. THE CONTRACTOR MUST CONFIRM & OBTAIN APPROVAL FOR ALL EQUIPMENT LOCATIONS (EXISTING & NEW) BEFORE INSTALLATION CAN COMMENCE.

THIS DRAWING WAS UPDATED AS LISTED BELOW:

- FIBRE NETWORK SPLIT INTO TWO SEPARATE NETWORKS (1 - PROCESS PLANT AND 2 - ICT & SECURITY).
- EQUIPMENT INDICATION STATUS TABLE ADDED, INDICATING IO INFORMATION TO BE AVAILABLE AND TRANSFERRED TO THE NETWORK.
- NOTES 7, 8 & 9 ADDED.
- HOLD POINTS ADDED.

**AECOM**

CAPE TOWN OFFICE  
 WATERLOO PLACE, SOUTH GATE  
 TYGER WATERFRONT  
 CARL CROONIE DRIVE  
 TEL: +27 (0)21 950 7500  
 FAX: +27 (0)21 950 7502  
 REG. NO. 1966/006628/07

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
02	ISSUED FOR CONSTRUCTION	KS	LB	CP	2020-10-08
	UPDATED FOR NEW CLIENT REQUIREMENTS				

CONTRACTOR / CONSULTANT				TRANSPNET CAPITAL PROJECTS			
TITLE	NAME	DATE	SIGN	TITLE	NAME	DATE	SIGN
DRAWN	KS	20	10	08			
CHECKED	DD	20	10	08			
DESIGNED	DD	20	10	08			
CHECKED	CP	20	10	08			

**TRANSNET**

TRANSNET LTD (INCORPORATED IN SOUTH AFRICA)  
 TABLE BAY BUILDINGS, TYGERSBERG PARK,  
 163 LUYKSRIG DRIVE, PLATTEKLOOF,  
 7601  
 TEL: 021 940 1999  
 FAX: 021 940 2425

**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT**  
**BULK POWER UPGRADE:**  
**NEW MAIN INTAKE SUBSTATION**  
**MONITORING AND CONTROL BLOCK DIAGRAM**

OPERATING DIVISIONS

TITLE	NAME	DATE	SIGN
PR. ENG. / PR. TECH. / PR. ARCH			
CPTM			
DATE			
SIGNATURE		21	04
REG. NUMBER	2022/0126		
SCALE	NTS		

PROJECT NUMBER: 000  
 FIBS: 001  
 DES: 1  
 DRAWING NO: 01  
 SHEET: 01  
 REV: 02  
 ID: AE

**LEGEND:**

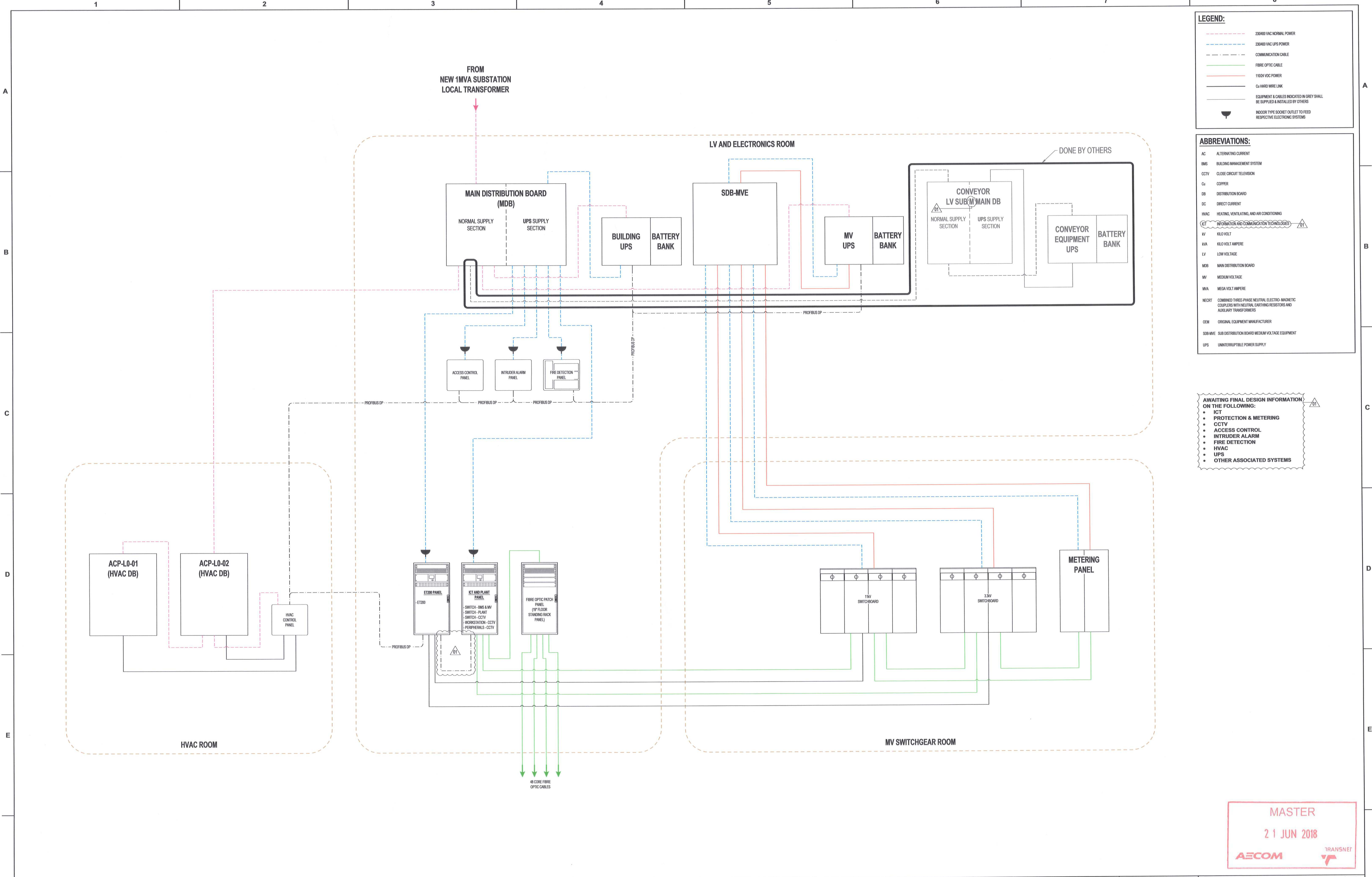
- 230/400 VAC NORMAL POWER
- 230/400 VAC UPS POWER
- COMMUNICATION CABLE
- FIBRE OPTIC CABLE
- 110/24 VDC POWER
- Cu HARD WIRE LINK
- EQUIPMENT & CABLES INDICATED IN GREY SHALL BE SUPPLIED & INSTALLED BY OTHERS
- INDOOR TYPE SOCKET OUTLET TO FEED RESPECTIVE ELECTRONIC SYSTEMS

**ABBREVIATIONS:**

- AC ALTERNATING CURRENT
- BMS BUILDING MANAGEMENT SYSTEM
- CCTV CLOSE CIRCUIT TELEVISION
- Cu COPPER
- DB DISTRIBUTION BOARD
- DC DIRECT CURRENT
- HVAC HEATING, VENTILATING, AND AIR CONDITIONING
- ICT INFORMATION AND COMMUNICATION TECHNOLOGIES
- IV KILOVOLT
- kVA KILOVOLT AMPERE
- LV LOW VOLTAGE
- MDB MAIN DISTRIBUTION BOARD
- MV MEDIUM VOLTAGE
- MVA MEGA VOLT AMPERE
- NECXT COMBINED THREE-PHASE NEUTRAL ELECTRO-MAGNETIC COUPLERS WITH NEUTRAL EARTHING RESISTORS AND AUXILIARY TRANSFORMERS
- OEM ORIGINAL EQUIPMENT MANUFACTURER
- SDB/MVE SUB DISTRIBUTION BOARD MEDIUM VOLTAGE EQUIPMENT
- UPS UNINTERRUPTIBLE POWER SUPPLY

**AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:**

- ICT
- PROTECTION & METERING
- CCTV
- ACCESS CONTROL
- INTRUDER ALARM
- FIRE DETECTION
- HVAC
- UPS
- OTHER ASSOCIATED SYSTEMS



**MASTER**  
21 JUN 2018

AECOM TRANSNET

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJÉ DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1966/006628/07

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION: • HOLD POINT ADDED • LV SUB 'N' MAIN DB CHANGE TO LV SUB 'M' MAIN DB • COMMUNICATION CABLE FROM ET200 TO ICT PANEL • ABBREVIATION LEGEND - 'ACRONYM' ICT ADDED	DD	BS	BS	2018-06-20
00	ISSUED FOR CONSTRUCTION	DD	BS	BS	2018-03-19

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	DD		18 06 20
				CHECKED	DC		18 06 20
				DESIGNED	LK		18 06 20
				CHECKED	BS		18 06 20

Transnet Capital Projects

**PORT OF SALDANHA**

IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE:  
SUBSTATION M  
LV & COMMUNICATION BLOCK DIAGRAM

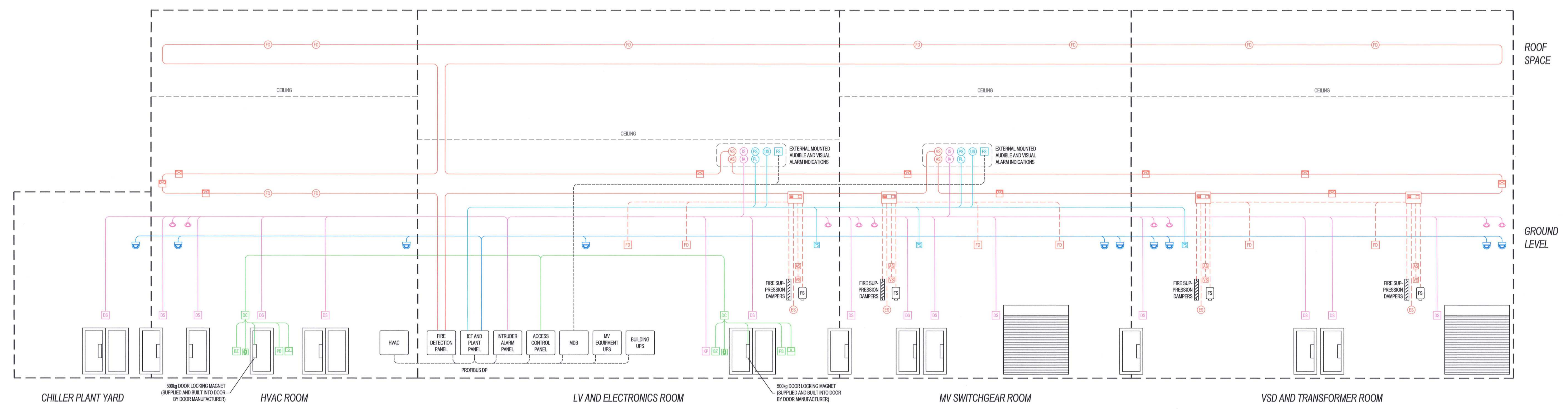
PROJECT NUMBER	DD	FBS	DBS	TYPE	DRAWING NO.	SHEET	REV	ID
19247011	-2	3	0	E	P	0	0	6

**LEGEND:**

- |  |   |   |  |   |  |
|--|---|---|--|---|--|
| <ul style="list-style-type: none"> <li>FD-MS FIRE DETECTION - ADDRESSABLE MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION</li> <li>FD-CV FIRE DETECTION - CONVENTIONAL NON-ADDRESSABLE MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION</li> <li>FD-VS FIRE DETECTION - VISUAL FIRE SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION</li> <li>FD-AS FIRE DETECTION - AUDIBLE FIRE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION</li> <li>FD-SV FIRE DETECTION - SUPPRESSION SYSTEM VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION</li> <li>FD-SB FIRE DETECTION - SUPPRESSION SYSTEM AUDIBLE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION</li> <li>FD-LC FIRE DETECTION - LOCAL CONTROL ADDRESSABLE FIRE PANEL COMPLETE AS PER SPECIFICATION</li> </ul> | <ul style="list-style-type: none"> <li>FD-RS FIRE DETECTION - RED, RESETTABLE, BREAK GLASS UNIT (MANUAL CALL POINT) COMPLETE AS PER SPECIFICATION</li> <li>FD-UI FIRE DETECTION - INPUT/OUTPUT INTERFACE UNIT COMPLETE AS PER SPECIFICATION</li> <li>FD-SE FIRE DETECTION - SUPPRESSION SYSTEM EMERGENCY STOP COMPLETE AS PER SPECIFICATION</li> <li>FD-SAP FIRE DETECTION - SANS APPROVED FIRE DETECTION SYSTEM LOOP CABLING COMPLETE AS PER SPECIFICATION</li> <li>FD-SAFS FIRE DETECTION - SANS APPROVED FIRE DETECTION SYSTEM ACTIVATION/POWER INTERFACE CABLING COMPLETE AS PER SPECIFICATION</li> <li>FD-LCP FIRE DETECTION - LOCAL CONTROL ADDRESSABLE FIRE PANEL COMPLETE AS PER SPECIFICATION</li> </ul> | <ul style="list-style-type: none"> <li>AC-BM ACCESS CONTROL - BIOMETRIC FINGER PRINT READER COMPLETE AS PER SPECIFICATION</li> <li>AC-DC ACCESS CONTROL - DOOR CONTROLLER AND POWER SUPPLY COMPLETE AS PER SPECIFICATION</li> <li>AC-ER ACCESS CONTROL - DOOR EXIT RELEASE BUTTON COMPLETE AS PER SPECIFICATION</li> <li>AC-DB ACCESS CONTROL - DOOR BUZZER COMPLETE AS PER SPECIFICATION</li> <li>AC-GR ACCESS CONTROL - GREEN, RESETTABLE, BREAK GLASS UNIT COMPLETE AS PER SPECIFICATION</li> <li>AC-AS ACCESS CONTROL - ACCESS CONTROL SYSTEM COMMUNICATIONS AND INTERFACE CABLING COMPLETE AS PER SPECIFICATION</li> </ul> | <ul style="list-style-type: none"> <li>IA-NR INTRUDER ALARM - DOOR (OPEN/CLOSE) SENSOR FOR NORMAL AND ROLLER SHUTTER DOORS COMPLETE AS PER SPECIFICATION</li> <li>IA-VS INTRUDER ALARM - VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION</li> <li>IA-AS INTRUDER ALARM - AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION</li> <li>IA-KP INTRUDER ALARM - KEYPAD COMPLETE AS PER SPECIFICATION</li> <li>IA-PIR INTRUDER ALARM - PIR INTRUDER DETECTOR COMPLETE AS PER SPECIFICATION</li> <li>IA-CC INTRUDER ALARM - COMMUNICATION AND INTERFACE CABLING COMPLETE AS PER SPECIFICATION</li> </ul> | <ul style="list-style-type: none"> <li>BSM-BMS BUILDING MANAGEMENT SYSTEM - PRESSURE SENSOR COMPLETE AS PER SPECIFICATION</li> <li>BSM-FS BUILDING MANAGEMENT SYSTEM - FIREMAN SWITCH COMPLETE AS PER SPECIFICATION</li> <li>BSM-PLS BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION</li> <li>BSM-SLA BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION</li> <li>BSM-LVS BUILDING MANAGEMENT SYSTEM - LVS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION (TO INDICATE THAT UPS IS LIVE)</li> <li>BSM-IC BUILDING MANAGEMENT SYSTEM - INTERFACE AND I/O CABLING COMPLETE AS PER SPECIFICATION</li> </ul> | <ul style="list-style-type: none"> <li>CCTV-SC CCTV - SECURITY CAMERA COMPLETE AS PER SPECIFICATION</li> <li>CCTV-CI CCTV - COMMUNICATION AND INTERFACE CABLING COMPLETE AS PER SPECIFICATION</li> <li>PROFIBUS-IP AND/OR I/O INTERFACE CABLING FROM RESPECTIVE SYSTEMS PANELS COMPLETE AS PER SPECIFICATION</li> <li>FS-FSC FIRE SUPPRESSION CYLINDER COMPLETE AS PER SPECIFICATION</li> <li>MVD-MVSD MOTORIZED VENTILATION DAMPERS/VENT COMPLETE AS PER SPECIFICATION</li> </ul> |
|--|---|---|--|---|--|

**ABBREVIATIONS:**

- CCTV - CLOSED-CIRCUIT TELEVISION
- HVAC - HEATING, VENTILATION AND AIR CONDITIONING
- ICT - INFORMATION AND COMMUNICATION TECHNOLOGIES
- LV - LOW VOLTAGE
- MV - MEDIUM VOLTAGE
- UPS - UNINTERRUPTIBLE POWER SUPPLY
- VSD - VARIABLE SPEED DRIVE



**AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:**

- ICT
- CCTV
- ACCESS CONTROL
- INTRUDER ALARM
- UPS
- FIRE DETECTION
- RESPECTIVE EQUIPMENT DETAILS SUPPLIED BY THE CONVEYOR CONTRACTOR
- OTHER ASSOCIATED SYSTEMS

MASTER  
28 JUN 2018  
AECOM

- NOTES**
- 1) DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - 2) THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEI SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - 3) FINAL DESIGNS TO BE UNDERTAKEN BY SPECIALIST CONTRACTOR(S) / OEM(S).
  - 4) FINAL POSITIONS, HEIGHTS AND THE LIKE TO BE FINALISED ON SITE IN CONJUNCTION WITH THE EMPLOYER.
  - 5) ALL FIRE DETECTION EQUIPMENT CONNECTED TO THE FIRE LOOPS SHALL BE ADDRESSABLE, AND ALL FIRE DETECTION EQUIPMENT CONNECTED TO LOCAL CONTROL ADDRESSABLE FIRE PANELS SHALL BE CONVENTIONAL NON-ADDRESSABLE, UNLESS OTHERWISE REQUIRED.
  - 6) THE CONTRACTOR SHALL ALLOW FOR SUFFICIENT POWER SUPPLY CAPACITY WITHIN THE RESPECTIVE CONTROL ADDRESSABLE FIRE PANELS TO DRIVE ALL ASSOCIATED DAMPERS AND VENTS.

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CROUSE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

ISSUED FOR CONSTRUCTION		DD	UK	CP	2018-06-27
NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION	DD	UK	CP	2018-06-27

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
-	-	-	-	DRAWN	DD	-	18 06 27
-	-	-	-	CHECKED	DC	-	18 06 27
-	-	-	-	DESIGNED	LK	-	18 06 27
-	-	-	-	CHECKED	BS	-	18 06 27

Transnet Capital Projects

TRANSNET

**PORT OF SALDANHA**

IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE:  
SUBSTATION M  
ELECTRONIC SERVICES BLOCK DIAGRAM

PROJECT NUMBER	00	FIBS	00	DSS	00	TYPE	EPD	DRAWING NO.	0007	SHEET	01	REV	00	ID	AE
----------------	----	------	----	-----	----	------	-----	-------------	------	-------	----	-----	----	----	----

**LEGEND:**

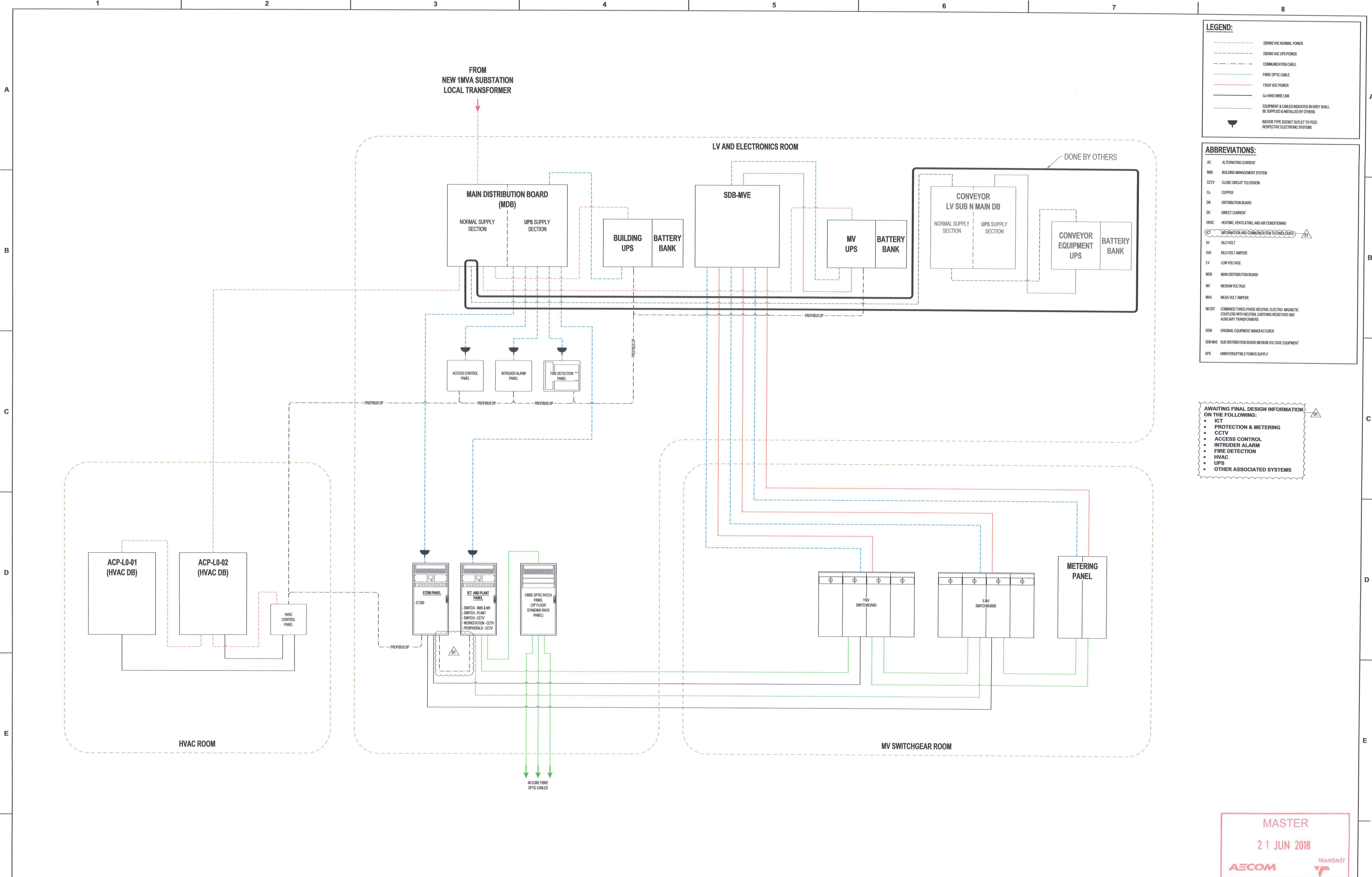
- 20KV0 VAC NORMAL POWER
- 20KV0 VAC UPS POWER
- COMMUNICATION CABLE
- FIBRE OPTIC CABLE
- 110V VDC POWER
- Cu HARD WIRE LINK
- EQUIPMENT & CABLES INDICATED IN GREY SHALL BE SUPPLIED & INSTALLED BY OTHERS
- INDOOR TYPE SOCKET OUTLET TO FEED RESPECTIVE ELECTRONIC SYSTEMS

**ABBREVIATIONS:**

- AC ALTERNATING CURRENT
- BMS BUILDING MANAGEMENT SYSTEM
- CCTV CLOSE CIRCUIT TELEVISION
- Cu COPPER
- DB DISTRIBUTION BOARD
- DC DIRECT CURRENT
- HVAC HEATING, VENTILATING, AND AIR CONDITIONING
- ICT INFORMATION AND COMMUNICATION TECHNOLOGIES
- KV KILO VOLT
- KVA KILO VOLT AMPERE
- LV LOW VOLTAGE
- MDB MAIN DISTRIBUTION BOARD
- MV MEDIUM VOLTAGE
- MVA MEGA VOLT AMPERE
- NECRT COMBINED THREE-PHASE NEUTRAL ELECTRO-MAGNETIC COUPLERS WITH NEUTRAL EARTHING RESISTORS AND AUXILIARY TRANSFORMERS
- OEM ORIGINAL EQUIPMENT MANUFACTURER
- SDB-MVE SUB-DISTRIBUTION BOARD MEDIUM VOLTAGE EQUIPMENT
- UPS UNINTERRUPTIBLE POWER SUPPLY

**AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:**

- ICT
- PROTECTION & METERING
- CCTV
- ACCESS CONTROL
- INTRUDER ALARM
- FIRE DETECTION
- HVAC
- UPS
- OTHER ASSOCIATED SYSTEMS



DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

**AECOM**

CAPE TOWN OFFICE  
 WATERSIDE PLACE, SOUTH GATE  
 TYGER WATERFRONT  
 CARL CRONJÉ DRIVE  
 TEL: +27 (0)21 950 7500  
 FAX: +27 (0)21 950 7502  
 REG. No. 1966/006628/07

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION: • HOLD POINT ADDED • COMMUNICATION CABLE FROM ET200 TO ICT PANEL • ABBREVIATION LEGEND - ACROINW/ ICT ADDED	DD	BS	BS	2018-06-20
00	ISSUED FOR CONSTRUCTION	DD	BS	BS	2018-03-19

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	DD		18 06 20
				CHECKED	DC		18 06 20
				DESIGNED	LK		18 06 20
				CHECKED	BS		18 06 20

**MASTER**  
21 JUN 2018

**AECOM** **TRANSNET**

Transnet Capital Projects  
 TABLE BAY BUILDING, TYGERBERG PARK,  
 160 LYS BURSE DRIVE, PLATTEKLOOF,  
 8001 TEL: 021 945 1995 FAX: 086 877 2455

**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT**  
**BULK POWER UPGRADE:**  
**SUBSTATION N**  
**LV & COMMUNICATION BLOCK DIAGRAM**

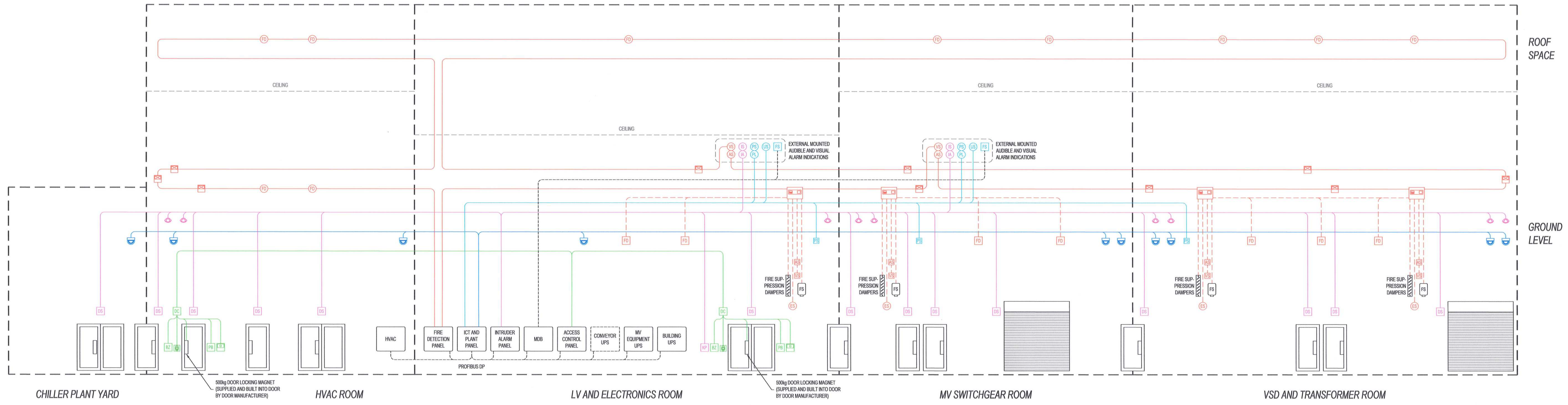
PROJECT NUMBER	ISS	DES	CHKD	APPD	DATE	SHEET	REV	ID
19247012	30	0	0	0	18 06 20	01	01	AE

**LEGEND:**

FD-MS (C)	FIRE DETECTION - ADDRESSABLE MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION	FD-R (C)	FIRE DETECTION - RED, RESETTABLE, BREAK GLASS UNIT (MANUAL CALL POINT) COMPLETE AS PER SPECIFICATION	AC-B (C)	ACCESS CONTROL - BIOMETRIC FINGER PRINT READER COMPLETE AS PER SPECIFICATION	IA-N (C)	INTRUDER ALARM - DOOR (OPEN/CLOSE) SENSOR FOR NORMAL AND ROLLER SHUTTER DOORS COMPLETE AS PER SPECIFICATION	BSM (C)	BUILDING MANAGEMENT SYSTEM - PRESSURE SENSOR COMPLETE AS PER SPECIFICATION	CCTV (C)	CCTV - SECURITY CAMERA COMPLETE AS PER SPECIFICATION
FD-C (C)	FIRE DETECTION - CONVENTIONALNON-ADDRESSABLE MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION	FD-I (C)	FIRE DETECTION - INPUT/OUTPUT INTERFACE UNIT COMPLETE AS PER SPECIFICATION	AC-D (C)	ACCESS CONTROL - DOOR CONTROLLER AND POWER SUPPLY COMPLETE AS PER SPECIFICATION	IA-V (C)	INTRUDER ALARM - VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION	BSM (C)	BUILDING MANAGEMENT SYSTEM - FIREMAN SWITCH COMPLETE AS PER SPECIFICATION	CCTV (C)	CCTV - COMMUNICATION AND INTERFACE CABLING COMPLETE AS PER SPECIFICATION
FD-V (C)	FIRE DETECTION - VISUAL FIRE SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION	FD-S (C)	FIRE DETECTION - SUPPRESSION SYSTEM EMERGENCY STOP COMPLETE AS PER SPECIFICATION	AC-E (C)	ACCESS CONTROL - DOOR EXIT RELEASE BUTTON COMPLETE AS PER SPECIFICATION	IA-A (C)	INTRUDER ALARM - AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION	BSM (C)	BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION	PROF (C)	PROFIBUS DP AND/OR IO INTERFACE CABLING FROM RESPECTIVE SYSTEMS PANELS COMPLETE AS PER SPECIFICATION
FD-A (C)	FIRE DETECTION - AUDIBLE FIRE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION	FD-L (C)	FIRE DETECTION - SANS APPROVED FIRE DETECTION SYSTEM LOOP CABLING COMPLETE AS PER SPECIFICATION	AC-BZ (C)	ACCESS CONTROL - DOOR BUZZER COMPLETE AS PER SPECIFICATION	IA-K (C)	INTRUDER ALARM - KEYPAD COMPLETE AS PER SPECIFICATION	BSM (C)	BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION	FS (C)	FIRE SUPPRESSION CYLINDER COMPLETE AS PER SPECIFICATION
FD-SV (C)	FIRE DETECTION - SUPPRESSION SYSTEM VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION	FD-SAP (C)	FIRE DETECTION - SANS APPROVED FIRE DETECTION SYSTEM ACTIVATION/POWER INTERFACE CABLING COMPLETE AS PER SPECIFICATION	AC-G (C)	ACCESS CONTROL - GREEN, RESETTABLE, BREAK GLASS UNIT COMPLETE AS PER SPECIFICATION	IA-PI (C)	INTRUDER ALARM - PIR INTRUDER DETECTOR COMPLETE AS PER SPECIFICATION	BSM (C)	BUILDING MANAGEMENT SYSTEM - UPS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION (TO INDICATE THAT UPS IS LIVE)	MVD (C)	MOTORIZED VENTILATION DAMPERS/VENT COMPLETE AS PER SPECIFICATION
FD-SA (C)	FIRE DETECTION - SUPPRESSION SYSTEM AUDIBLE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION	FD-LC (C)	FIRE DETECTION - LOCAL CONTROL ADDRESSABLE FIRE PANEL COMPLETE AS PER SPECIFICATION	AC-SC (C)	ACCESS CONTROL - ACCESS CONTROL SYSTEM COMMUNICATIONS AND INTERFACE CABLING COMPLETE AS PER SPECIFICATION	IA-CC (C)	INTRUDER ALARM - COMMUNICATION AND INTERFACE CABLING COMPLETE AS PER SPECIFICATION	BSM (C)	BUILDING MANAGEMENT SYSTEM - INTERFACE AND IO CABLING COMPLETE AS PER SPECIFICATION		

**ABBREVIATIONS:**

CCTV	- CLOSED-CIRCUIT TELEVISION
HVAC	- HEATING, VENTILATION AND AIR CONDITIONING
ICT	- INFORMATION AND COMMUNICATION TECHNOLOGIES
LV	- LOW VOLTAGE
MV	- MEDIUM VOLTAGE
UPS	- UNINTERRUPTIBLE POWER SUPPLY
VSD	- VARIABLE SPEED DRIVE



**AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:**

- ICT
- CCTV
- ACCESS CONTROL
- INTRUDER ALARM
- UPS
- FIRE DETECTION
- RESPECTIVE EQUIPMENT DETAILS SUPPLIED BY THE CONVEYOR CONTRACTOR
- OTHER ASSOCIATED SYSTEMS

MASTER  
28 JUN 2018  
AECOM

- NOTES**
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEAREST SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - FINAL DESIGNS TO BE UNDERTAKEN BY SPECIALIST CONTRACTOR(S) / OEM(S).
  - FINAL POSITIONS, HEIGHTS AND THE LIKE TO BE FINALISED ON SITE IN CONJUNCTION WITH THE EMPLOYER.
  - ALL FIRE DETECTION EQUIPMENT CONNECTED TO THE FIRE LOOPS SHALL BE ADDRESSABLE, AND ALL FIRE DETECTION EQUIPMENT CONNECTED TO LOCAL CONTROL ADDRESSABLE FIRE PANELS SHALL BE CONVENTIONALNON-ADDRESSABLE, UNLESS OTHERWISE SPECIFIED.
  - THE CONTRACTOR SHALL ALLOW FOR SUFFICIENT POWER SUPPLY CAPACITY WITHIN THE RESPECTIVE CONTROL ADDRESSABLE FIRE PANELS TO DRIVE ALL ASSOCIATED DAMPERS AND VENTS.

**AECOM**  
CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1966/006628/07

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	LK	CP	2018-06-27

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	DD		18/06/27
				CHECKED	DC		18/06/27
				DESIGNED	LK		18/06/27
				CHECKED	BS		18/06/27

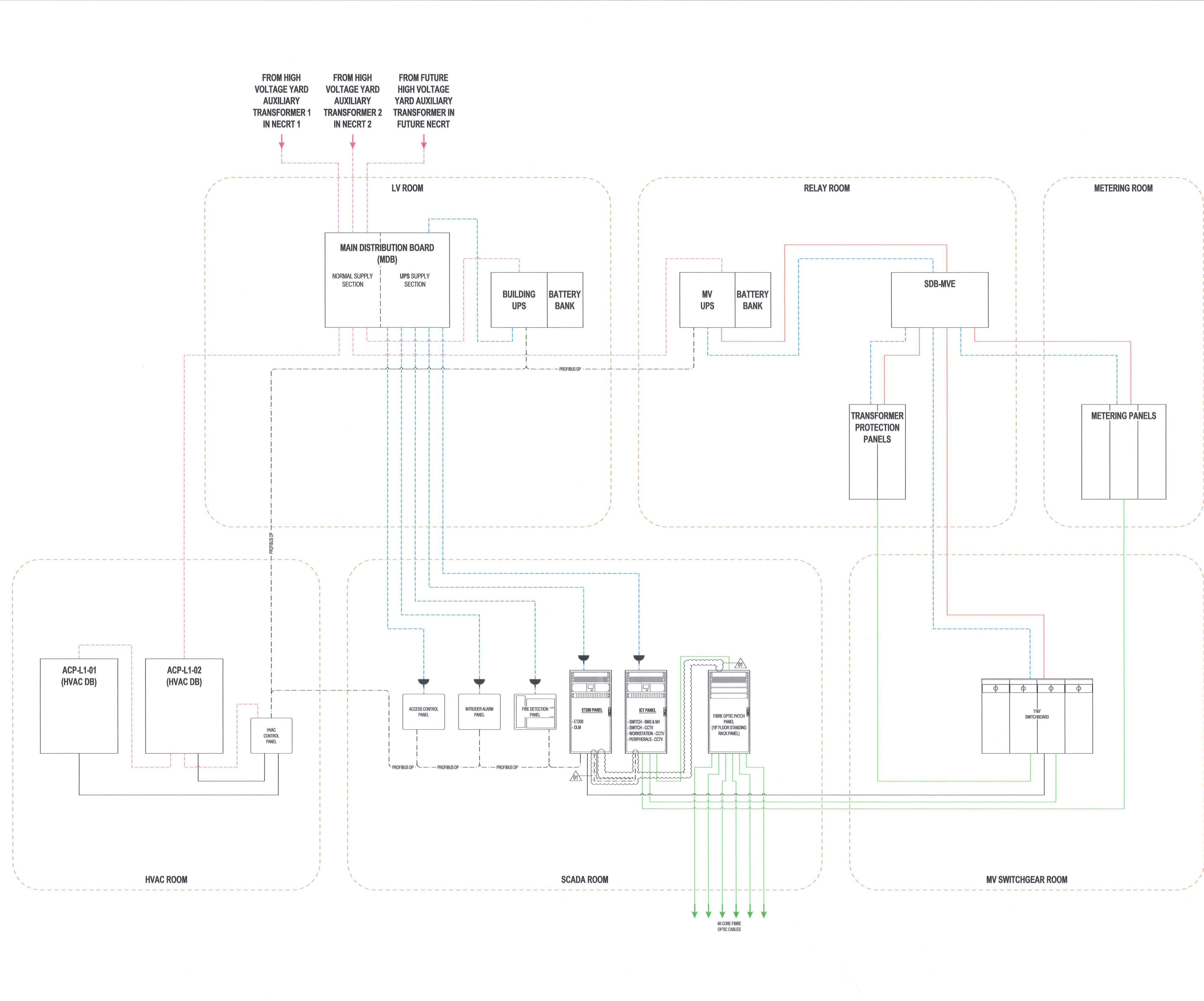
Transnet Capital Projects

**PORT OF SALDANHA**

IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE:  
SUBSTATION N  
ELECTRONIC SERVICES BLOCK DIAGRAM

PROJECT NUMBER	DD	FBS	DMS	TYPE	DRAWING NO.	SHEET	REV	ID
1924701	2	3	0	E	P	0	0	010100AE





**LEGEND:**

- 230/400 VAC NORMAL POWER
- 230/400 VAC UPS POWER
- COMMUNICATION CABLE
- FIBRE OPTIC CABLE
- 110/24 VDC POWER
- Cu HARD WIRE LINK
- EQUIPMENT & CABLES INDICATED IN GREY SHALL BE SUPPLIED & INSTALLED BY OTHERS
- INDOOR TYPE SOCKET OUTLET TO FEED RESPECTIVE ELECTRONIC SYSTEMS

**ABBREVIATIONS:**

- AC ALTERNATING CURRENT
- BMS BUILDING MANAGEMENT SYSTEM
- CCTV CLOSE CIRCUIT TELEVISION
- Cu COPPER
- DB DISTRIBUTION BOARD
- DC DIRECT CURRENT
- HVAC HEATING, VENTILATING, AND AIR CONDITIONING
- ICT INFORMATION AND COMMUNICATION TECHNOLOGIES
- KV KILO VOLT
- KVA KILO VOLT AMPERE
- LV LOW VOLTAGE
- MDB MAIN DISTRIBUTION BOARD
- MV MEDIUM VOLTAGE
- MVA MEGA VOLT AMPERE
- NECRT COMBINED THREE-PHASE NEUTRAL ELECTRO-MAGNETIC COUPLERS WITH NEUTRAL EARTHING RESISTORS AND AUXILIARY TRANSFORMERS
- OEM ORIGINAL EQUIPMENT MANUFACTURER
- SDB-MVE SUB DISTRIBUTION BOARD MEDIUM VOLTAGE EQUIPMENT
- UPS UNINTERRUPTIBLE POWER SUPPLY

**AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:**

- ICT
- PROTECTION & METERING
- ACCESS CONTROL
- INTRUDER ALARM
- FIRE DETECTION
- HVAC
- UPS
- OTHER ASSOCIATED SYSTEMS

**MASTER**  
21 JUN 2018

**AECOM**      **TRANSNET**

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

**ISSUED FOR CONSTRUCTION:**

- HOLD POINT ADDED
- COMMUNICATION CABLE FROM ET200 TO ICT PANEL
- OPTIC FIBRE CABLE OMITTED FROM FIBRE OPTIC PATCH PANEL TO ICT PANEL
- ABBREVIATION LEGEND - ACRONYM 'ICT' ADDED

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION	DO	BS	BS	2018-06-20
02	ISSUED FOR CONSTRUCTION	DO	BS	BS	2018-03-19

**REVISIONS**

This document including all design and information remains the Confidential Intellectual Property of Transnet.  
Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	DD		18/06/20
				CHECKED	DC		18/06/20
				DESIGNED	LK		18/06/20
				CHECKED	BS		18/06/20

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

PRELIMINARY / PR. TECH./PR. ARCH	
NAME	DATE

Transnet Capital Projects

TRANSNET

**PORT OF SALDANHA**

**IRON ORE TIPPLER 3 PROJECT**  
**BULK POWER UPGRADE:**  
**NEW MAIN INTAKE SUBSTATION**  
**LV & COMMUNICATION BLOCK DIAGRAM**

PROJECT NUMBER	DO	FBS	DHS	TYPE	DRAWING NO.	SHEET	REV	ID
19	2	4	7	0	1	2	3	0

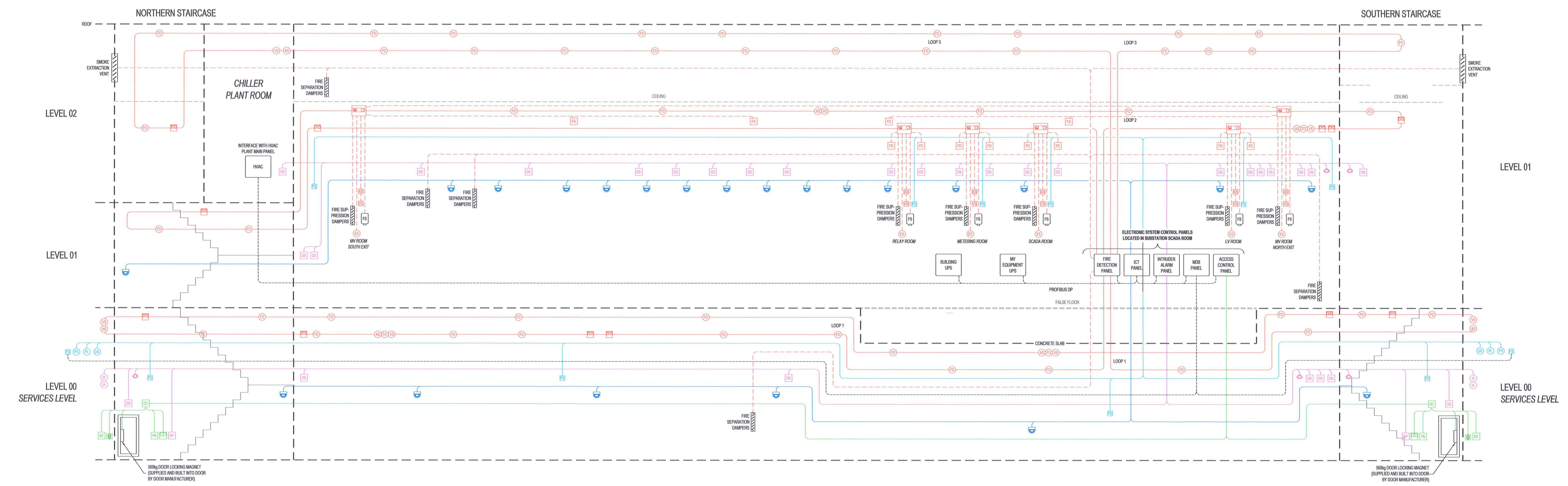
SCALE: NTS

**LEGEND:**

- FD1 FIRE DETECTION - ADDRESSABLE MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION
- FD2 FIRE DETECTION - CONVENTIONAL NON-ADDRESSABLE MULTISENSOR FIRE DETECTOR COMPLETE AS PER SPECIFICATION
- FD3 FIRE DETECTION - VISUAL FIRE SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- FD4 FIRE DETECTION - AUDIBLE FIRE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- FD5 FIRE DETECTION - SUPPRESSION SYSTEM VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- FD6 FIRE DETECTION - SUPPRESSION SYSTEM AUDIBLE SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- FD7 FIRE DETECTION - LOCAL CONTROL ADDRESSABLE FIRE PANEL COMPLETE AS PER SPECIFICATION
- FD8 FIRE DETECTION - RED, RESETTABLE, BREAK GLASS UNIT (MANUAL CALL POINT) COMPLETE AS PER SPECIFICATION
- FD9 FIRE DETECTION - INPUT/OUTPUT INTERFACE UNIT COMPLETE AS PER SPECIFICATION
- FD10 FIRE DETECTION - SUPPRESSION SYSTEM EMERGENCY STOP COMPLETE AS PER SPECIFICATION
- FD11 FIRE DETECTION - SANS APPROVED FIRE DETECTION SYSTEM LOOP CABLING COMPLETE AS PER SPECIFICATION
- FD12 FIRE DETECTION - SANS APPROVED FIRE DETECTION SYSTEM ACTIVATION/POWER INTERFACE CABLING COMPLETE AS PER SPECIFICATION
- FD13 FIRE DETECTION - LOCAL CONTROL ADDRESSABLE FIRE PANEL COMPLETE AS PER SPECIFICATION
- AC1 ACCESS CONTROL - BIOMETRIC FINGER PRINT READER COMPLETE AS PER SPECIFICATION
- AC2 ACCESS CONTROL - DOOR CONTROLLER AND POWER SUPPLY COMPLETE AS PER SPECIFICATION
- AC3 ACCESS CONTROL - DOOR EXIT RELEASE BUTTON COMPLETE AS PER SPECIFICATION
- AC4 ACCESS CONTROL - DOOR BUZZER COMPLETE AS PER SPECIFICATION
- AC5 ACCESS CONTROL - GREEN, RESETTABLE, BREAK GLASS UNIT COMPLETE AS PER SPECIFICATION
- AC6 ACCESS CONTROL - ACCESS CONTROL SYSTEM COMMUNICATIONS AND INTERFACE CABLING COMPLETE AS PER SPECIFICATION
- IA1 INTRUDER ALARM - DOOR (OPEN/CLOSE) SENSOR FOR NORMAL AND ROLLER SHUTTER DOORS COMPLETE AS PER SPECIFICATION
- IA2 INTRUDER ALARM - VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- IA3 INTRUDER ALARM - AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- IA4 INTRUDER ALARM - KEYPAD COMPLETE AS PER SPECIFICATION
- IA5 INTRUDER ALARM - PIR INTRUDER DETECTOR COMPLETE AS PER SPECIFICATION
- IA6 INTRUDER ALARM - COMMUNICATION AND INTERFACE CABLING COMPLETE AS PER SPECIFICATION
- BS1 BUILDING MANAGEMENT SYSTEM - PRESSURE SENSOR COMPLETE AS PER SPECIFICATION
- BS2 BUILDING MANAGEMENT SYSTEM - FIREMAN SWITCH COMPLETE AS PER SPECIFICATION
- BS3 BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION
- BS4 BUILDING MANAGEMENT SYSTEM - PRESSURE LOSS AUDIBLE ALARM SIGNAL (SIREN) COMPLETE AS PER SPECIFICATION
- BS5 BUILDING MANAGEMENT SYSTEM - LPS VISUAL SIGNAL (LIGHT) COMPLETE AS PER SPECIFICATION (TO INDICATE THAT LPS IS LIVE)
- BS6 BUILDING MANAGEMENT SYSTEM - INTERFACE AND I/O CABLING COMPLETE AS PER SPECIFICATION
- CC1 CCTV - SECURITY CAMERA COMPLETE AS PER SPECIFICATION
- CC2 CCTV - COMMUNICATION AND INTERFACE CABLING COMPLETE AS PER SPECIFICATION
- CC3 PROFIBUS DP AND/OR I/O INTERFACE CABLING FROM RESPECTIVE SYSTEMS PANELS COMPLETE AS PER SPECIFICATION
- FS1 FIRE SUPPRESSION CYLINDER COMPLETE AS PER SPECIFICATION
- MS1 MOTORISED VENTILATION DAMPERS/VENT COMPLETE AS PER SPECIFICATION

**ABBREVIATIONS:**

- CCTV - CLOSED-CIRCUIT TELEVISION
- HVAC - HEATING, VENTILATION AND AIR CONDITIONING
- ICT - INFORMATION AND COMMUNICATION TECHNOLOGIES
- LV - LOW VOLTAGE
- MV - MEDIUM VOLTAGE
- LPS - UNINTERRUPTIBLE POWER SUPPLY
- VSD - VARIABLE SPEED DRIVE



**AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:**

- ICT
- CCTV
- ACCESS CONTROL
- INTRUDER ALARM
- LPS
- FIRE DETECTION
- OTHER ASSOCIATED SYSTEMS

MASTER  
28 JUN 2018  
ASCOM

- NOTES**
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - FINAL DESIGNS TO BE UNDERTAKEN BY SPECIALIST CONTRACTOR(S) / OEM(S).
  - FINAL POSITIONS, HEIGHTS AND THE LIKE TO BE FINALISED ON SITE IN CONJUNCTION WITH THE EMPLOYER.
  - ALL FIRE DETECTION EQUIPMENT CONNECTED TO THE FIRE LOOPS SHALL BE ADDRESSABLE, AND ALL FIRE DETECTION EQUIPMENT CONNECTED TO LOCAL CONTROL ADDRESSABLE FIRE PANELS SHALL BE CONVENTIONAL NON-ADDRESSABLE, UNLESS OTHERWISE REQUIRED.
  - THE CONTRACTOR SHALL ALLOW FOR SUFFICIENT POWER SUPPLY CAPACITY WITHIN THE RESPECTIVE CONTROL ADDRESSABLE FIRE PANELS TO DRIVE ALL ASSOCIATED DAMPERS AND VENTS.

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	SIGN	DATE
DRAWN	DD		18 06 27
CHECKED	DC		18 06 27
DESIGNED	LK		18 06 27
CHECKED	BS		18 06 27

OPERATING DIVISIONS		PRELIMINARY / PR. TECH. / PR. ARCH	
TITLE	NAME	SIGN	DATE
NAME	C P M		DATE
SIGNATURE			18 06 27
REG. NUMBER	2012/0126		
SCALE:	NTS		

Transnet Capital Projects		<b>TRANSNET</b>	
TRANSNET LTD (TRANSNET AS TRANSNET CAPITAL PROJECTS) REG. NO. 200000000 TABLE VIEW BUILDING, TYGERBERG PARK, 163 LYS KRIGER DRIVE, PLATTEKLOOF, 8001 TEL: 021 940 1999 FAX: 021 940 3455			
<b>PORT OF SALDANHA</b>			
IRON ORE TIPPLER 3 PROJECT BULK POWER UPGRADE: NEW MAIN INTAKE SUBSTATION ELECTRONIC SERVICES BLOCK DIAGRAM			
PROJECT NUMBER	001	FBS	001
DOS	2	TYPE	3
DRAWING NO.	01	SHEET	01
REV	01	ID	00

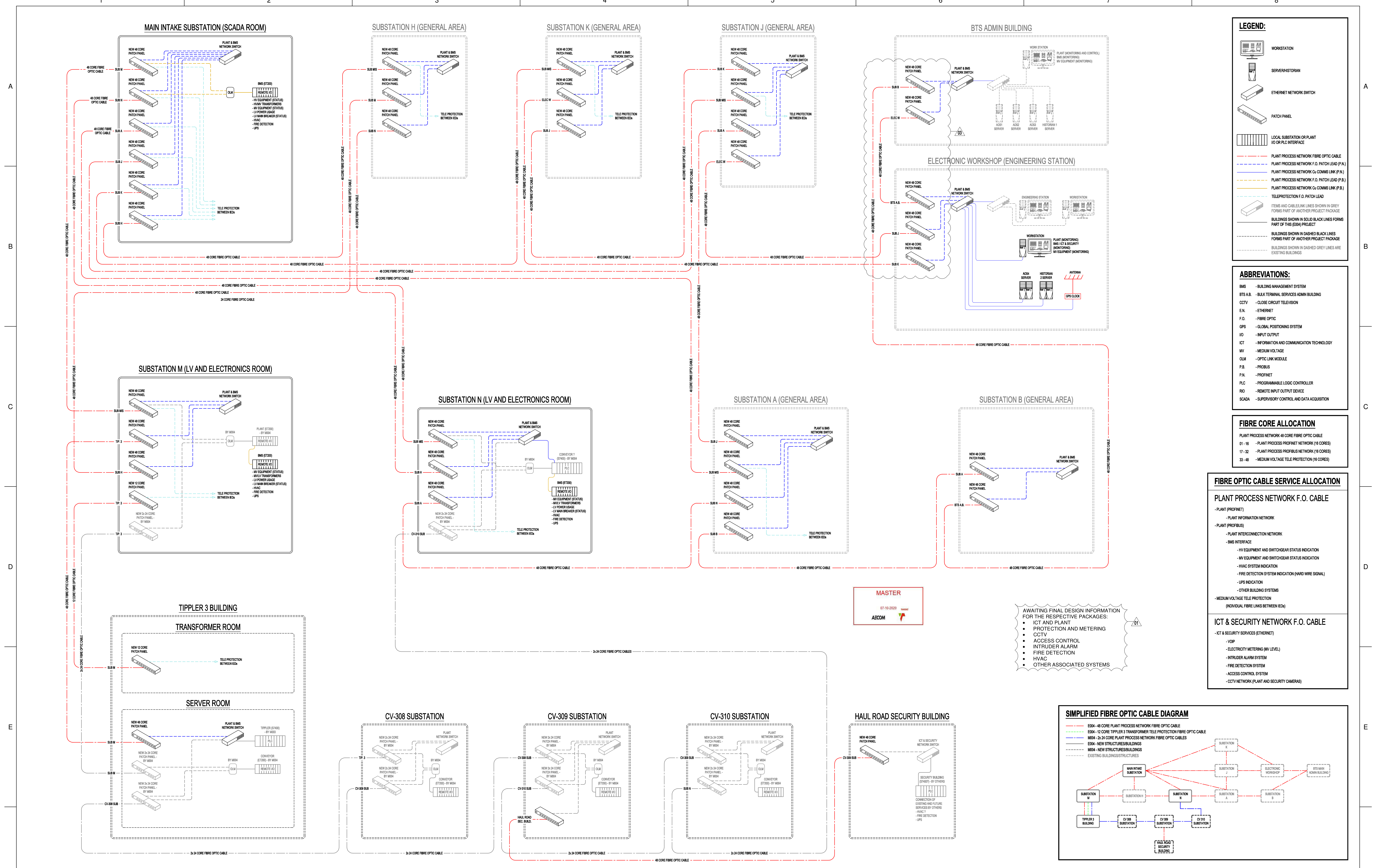
DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	LK	CP	2018-06-27

This document including all design and information remains the Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.

PROJECT NUMBER	001	FBS	001
DOS	2	TYPE	3
DRAWING NO.	01	SHEET	01
REV	01	ID	00



**LEGEND:**

- WORKSTATION
- SERVER/HISTORIAN
- ETHERNET NETWORK SWITCH
- PATCH PANEL
- LOCAL SUBSTATION OR PLANT IO OR PLC INTERFACE
- PLANT PROCESS NETWORK F.O. PATCH LEAD (P.N.)
- PLANT PROCESS NETWORK C4 COMMS LINK (P.C.)
- PLANT PROCESS NETWORK F.O. PATCH LEAD (P.B.)
- PLANT PROCESS NETWORK C4 COMMS LINK (P.B.)
- TELEPROTECTION F.O. PATCH LEAD
- ITEMS AND CABLE LINK LINES SHOWN IN GREY FORMS PART OF ANOTHER PROJECT PACKAGE
- BUILDINGS SHOWN IN SOLID BLACK LINES FORMS PART OF THIS (E004) PROJECT
- BUILDINGS SHOWN IN DASHED BLACK LINES FORMS PART OF ANOTHER PROJECT PACKAGE
- BUILDINGS SHOWN IN DASHED GREY LINES ARE EXISTING BUILDINGS

**ABBREVIATIONS:**

- BMS - BUILDING MANAGEMENT SYSTEM
- BTS A,B - BULK TERMINAL SERVICES ADMIN BUILDING
- CCTV - CLOSE CIRCUIT TELEVISION
- E.N. - ETHERNET
- F.O. - FIBRE OPTIC
- GPS - GLOBAL POSITIONING SYSTEM
- IO - INPUT/OUTPUT
- ICT - INFORMATION AND COMMUNICATION TECHNOLOGY
- LV - MEDIUM VOLTAGE
- OM - OPTIC LINK MODULE
- P.B. - PROFIBUS
- PROFINET - PROFIBUS
- PLC - PROGRAMMABLE LOGIC CONTROLLER
- PIO - REMOTE INPUT/OUTPUT DEVICE
- SCADA - SUPERVISORY CONTROL AND DATA ACQUISITION

**FIBRE CORE ALLOCATION**

PLANT PROCESS NETWORK 48 CORE FIBRE OPTIC CABLE

- 01 - 16 - PLANT PROCESS PROFIBUS NETWORK (16 CORES)
- 17 - 32 - PLANT PROCESS PROFIBUS NETWORK (16 CORES)
- 33 - 48 - MEDIUM VOLTAGE TELE PROTECTION (16 CORES)

**FIBRE OPTIC CABLE SERVICE ALLOCATION**

**PLANT PROCESS NETWORK F.O. CABLE**

- PLANT (PROFINET)
- PLANT INFORMATION NETWORK
- PLANT (PROFIBUS)
- PLANT INTERCONNECTION NETWORK
- BMS INTERFACE
- HV EQUIPMENT AND SWITCHGEAR STATUS INDICATION
- LV EQUIPMENT AND SWITCHGEAR STATUS INDICATION
- HVAC SYSTEM INDICATION
- FIRE DETECTION SYSTEM INDICATION (HARD WIRE SIGNAL)
- UPS INDICATION
- OTHER BUILDING SYSTEMS
- MEDIUM VOLTAGE TELE PROTECTION (INDIVIDUAL FIBRE LINKS BETWEEN IEDs)

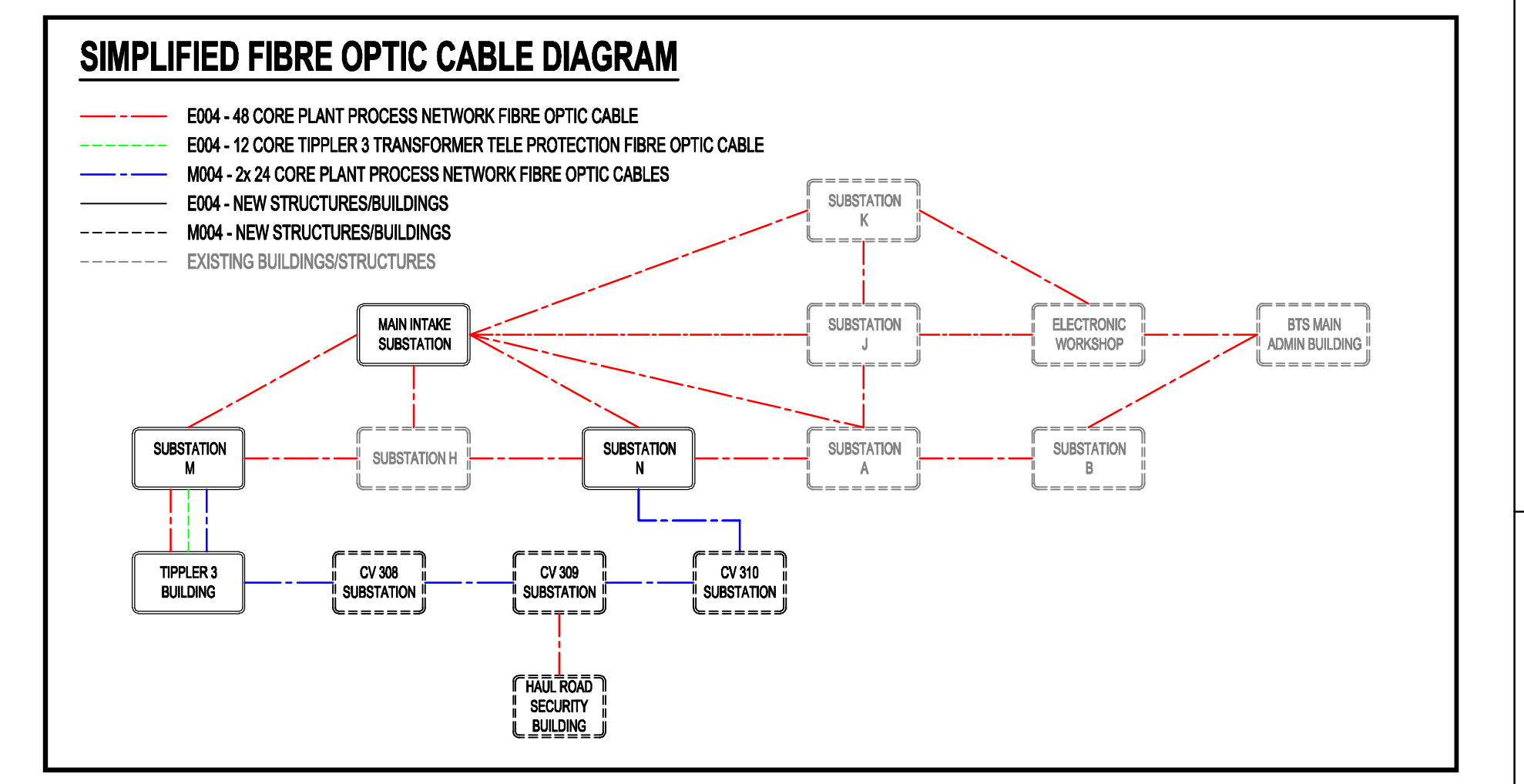
**ICT & SECURITY NETWORK F.O. CABLE**

- ICT & SECURITY SERVICES (ETHERNET)
- VOP
- ELECTRICITY METERING (M.V. LEVEL)
- INTRUDER ALARM SYSTEM
- FIRE DETECTION SYSTEM
- ACCESS CONTROL SYSTEM
- CCTV NETWORK (PLANT AND SECURITY CAMERAS)



AWAITING FINAL DESIGN INFORMATION FOR THE RESPECTIVE PACKAGES:

- ICT AND PLANT
- PROTECTION AND METERING
- CCTV
- ACCESS CONTROL
- INTRUDER ALARM
- FIRE DETECTION
- HVAC
- OTHER ASSOCIATED SYSTEMS



DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- CONTRACTOR SHALL COORDINATE WITH OTHERS TO OBTAIN THEIR FINAL NETWORK ARCHITECTURE.

**AECOM**

CAFTOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
03	ISSUED FOR CONSTRUCTION	JF	LK	CP	20-10-06
02	ISSUED FOR CONSTRUCTION REFER TO THE NOTES SECTION FOR REVISION DESCRIPTION	JF	LK	CP	20-09-22
01	ISSUED FOR CONSTRUCTION	GB	LMB	CP	18-06-04
00	ISSUED FOR CONSTRUCTION	GB	LMB	CP	18-03-15

**REVISIONS**

This Document including all design and information therein is Confidential Intellectual Property of Transnet.  
Copyright and all other rights are reserved by Transnet. This Document may not be used for its intended purpose.

CONTRACTOR / CONSULTANT		TRANSPNET CAPITAL PROJECTS	
TITLE	NAME	SIGN	DATE
DRAWN	JF	20	10 06
CHECKED	DD	20	10 06
DESIGNED	LK	20	10 06
CHECKED	CP	20	10 06

OPERATING DIVISIONS

TITLE	NAME	SIGN	DATE
PR. ENGR. / PR. TECH. / PR. ARCH			
NAME	C. P. M.	DATE	20 10 06
SIGNATURE		DATE	20 10 06
REG. NUMBER	20279216	SCALE:	NTS

Transnet Capital Projects

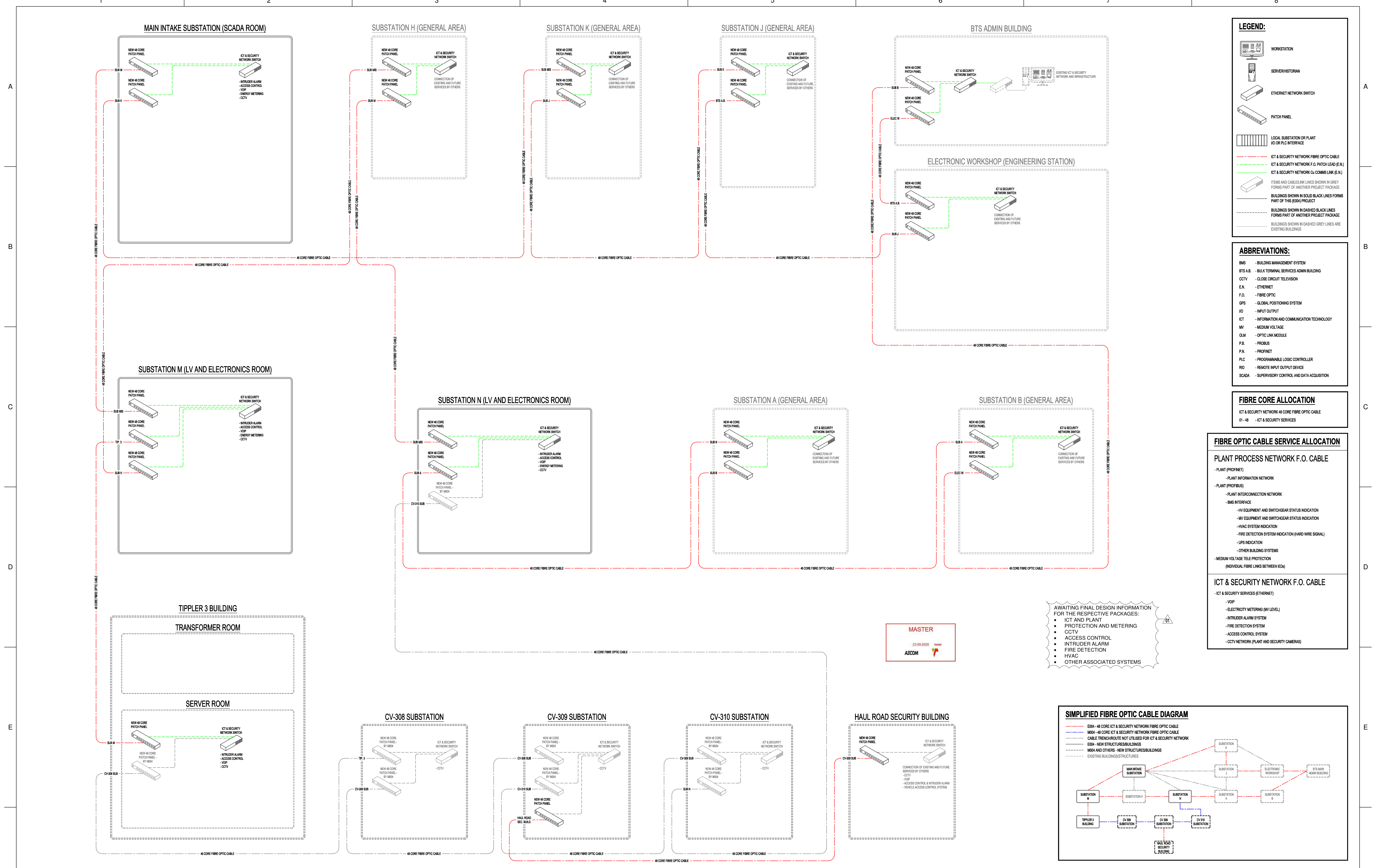
**TRANSNET**

TRANSNET LTD. 17000000 AT TRANSNET CAPITAL PROJECTS. REG. NO. 19660000000  
TABLE BAY BUILDING, TYGERSBERG PARK, TEL: 021 940 1999  
163 LUYK DRIVE, PLATTEKLOOF, FAX: 021 940 2485  
8001

**PORT OF SALDANHA**

IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE  
HIGH LEVEL PLANT PROCESS NETWORK  
ARCHITECTURE AND INTEGRATION  
BLOCK DIAGRAM

PROJECT NUMBER: 00 19 2 4 7 0 1 - 2 - 3 0 0 - E - P - D - 0 1 2 - 0 1 0 3 AE



**LEGEND:**

- WORKSTATION
- SERVER/HISTORIAN
- ETHERNET NETWORK SWITCH
- PATCH PANEL
- LOCAL SUBSTATION OR PLANT IO OR PLC INTERFACE
- ICT & SECURITY NETWORK FIBRE OPTIC CABLE
- ICT & SECURITY NETWORK F.O. PATCH LEAD (E.N.)
- ICT & SECURITY NETWORK CoMMS LINK (E.N.)
- ITEMS AND CABLE LINK LINES SHOWN IN GREY FORMS PART OF ANOTHER PROJECT PACKAGE
- BUILDINGS SHOWN IN SOLID BLACK LINES FORMS PART OF THIS (E04) PROJECT
- BUILDINGS SHOWN IN DASHED BLACK LINES FORMS PART OF ANOTHER PROJECT PACKAGE
- BUILDINGS SHOWN IN DASHED GREY LINES ARE EXISTING BUILDINGS

**ABBREVIATIONS:**

- BMS - BUILDING MANAGEMENT SYSTEM
- BTS A.B. - BULK TERMINAL SERVICES ADMIN BUILDING
- CCTV - CLOSE CIRCUIT TELEVISION
- E.N. - ETHERNET
- F.O. - FIBRE OPTIC
- GPS - GLOBAL POSITIONING SYSTEM
- IO - INPUT OUTPUT
- ICT - INFORMATION AND COMMUNICATION TECHNOLOGY
- MV - MEDIUM VOLTAGE
- QM - OPTIC LINK MODULE
- P.B. - PROBUS
- P.N. - PROFIBET
- PLC - PROGRAMMABLE LOGIC CONTROLLER
- RIO - REMOTE INPUT OUTPUT DEVICE
- SCADA - SUPERVISORY CONTROL AND DATA ACQUISITION

**FIBRE CORE ALLOCATION**

ICT & SECURITY NETWORK: 48 CORE FIBRE OPTIC CABLE  
 01-48 - ICT & SECURITY SERVICES

**FIBRE OPTIC CABLE SERVICE ALLOCATION**

**PLANT PROCESS NETWORK F.O. CABLE**

- PLANT (PROFINET)
- PLANT INFORMATION NETWORK
- PLANT (PROFIBUS)
- PLANT INTERCONNECTION NETWORK
- BMS INTERFACE
- HV EQUIPMENT AND SWITCHGEAR STATUS INDICATION
- MV EQUIPMENT AND SWITCHGEAR STATUS INDICATION
- HVAC SYSTEM INDICATION
- FIRE DETECTION SYSTEM INDICATION (HARD WIRE SIGNAL)
- UPS INDICATION
- OTHER BUILDING SYSTEMS
- MEDIUM VOLTAGE TELE PROTECTION (INDIVIDUAL FIBRE LINKS BETWEEN EDA)

**ICT & SECURITY NETWORK F.O. CABLE**

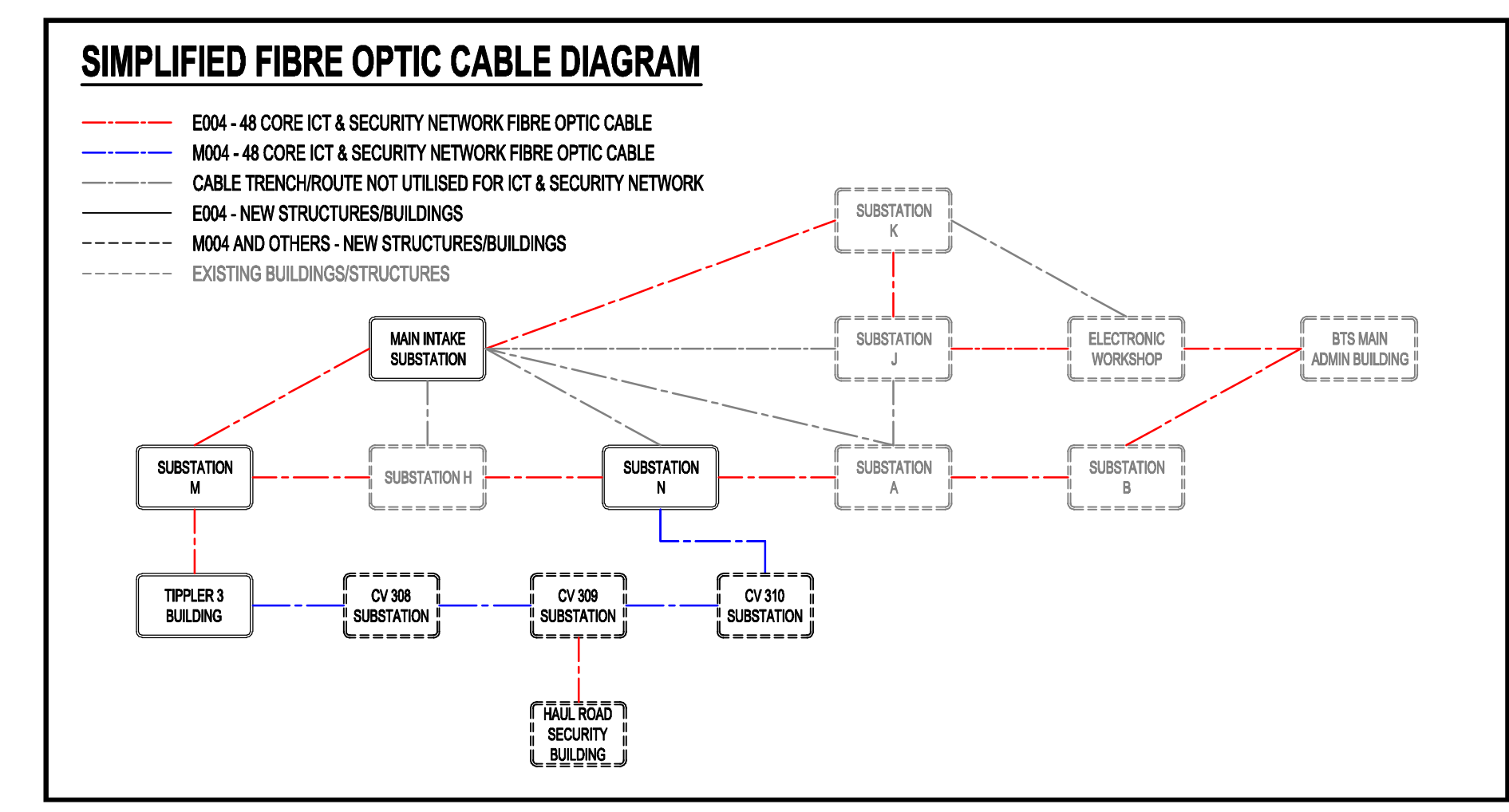
ICT & SECURITY SERVICES (ETHERNET)

- VOP
- ELECTRICITY METERING (M LEVEL)
- INTRUDER ALARM SYSTEM
- FIRE DETECTION SYSTEM
- ACCESS CONTROL SYSTEM
- CCTV NETWORK (PLANT AND SECURITY CAMERAS)

AWAITING FINAL DESIGN INFORMATION FOR THE RESPECTIVE PACKAGES:

- ICT AND PLANT
- PROTECTION AND METERING
- CCTV
- ACCESS CONTROL
- INTRUDER ALARM
- FIRE DETECTION
- HVAC
- OTHER ASSOCIATED SYSTEMS

**MASTER**  
 23-09-2020  
 AECOM



**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- CONTRACTOR SHALL COORDINATE WITH OTHERS TO OBTAIN THEIR FINAL NETWORK ARCHITECTURE.

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**AECOM**

OPERATION OFFICE  
 WATERSIDE PLACE, SOUTH GATE  
 TYGER WATERFRONT  
 CARL CRONJE DRIVE  
 TEL: +27 (0)21 950 7500  
 FAX: +27 (0)21 950 7502  
 REG. No. 1966/006628/07

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	SIGN	DATE
DRAWN	JF		20 09 22
CHECKED	DD		20 09 22
DESIGNED	LK		20 09 22
CHECKED	CP		20 09 22

OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH			
TITLE	NAME	SIGN	DATE		
00	ISSUED FOR CONSTRUCTION	JF	LK	CP	20-09-21
NO.	DESCRIPTION	BY	CHKD	APPD	DATE

**REVISIONS**

This Document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This Document may only be used for its intended purpose.

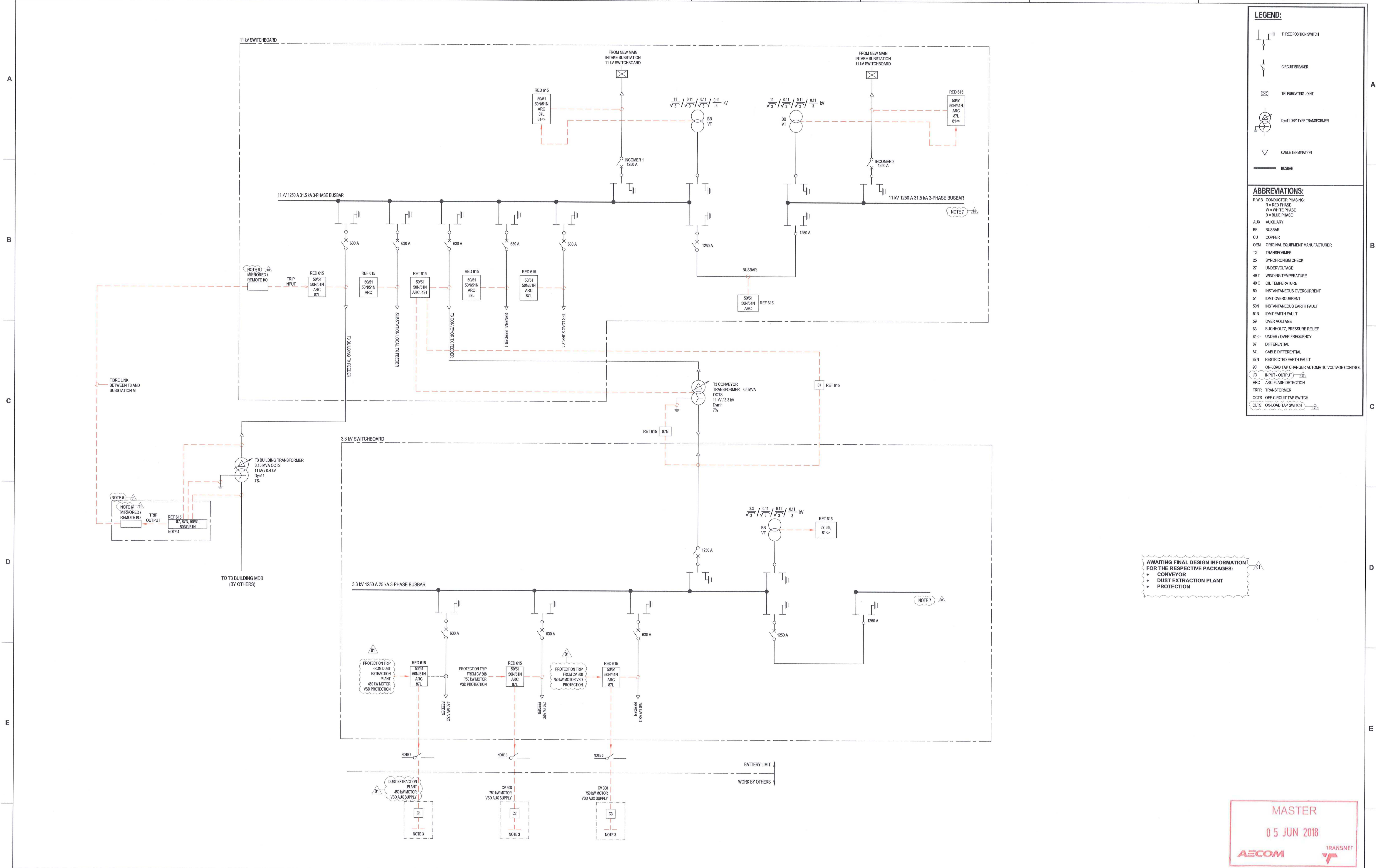
CONTRACTOR / CONSULTANT: TRANSNET CAPITAL PROJECTS

TRANSNET CAPITAL PROJECTS  
 TRANSNET LTD. TRADING AS TRANSNET CAPITAL PROJECTS, REG. NO. 960000000  
 TABLE BAY BUILDINGS, TYGERSBERG PARK, TEL: 021 940 1999  
 163 LUYKSRIGDE DRIVE, PLATTEKLOOF, TEL: 081 977 2455  
 8001 FAX: 081 977 2455

**PORT OF SALDANHA**  
 IRON ORE TIPLER 3 PROJECT  
 BULK POWER UPGRADE:  
 HIGH LEVEL ICT & SECURITY NETWORK  
 ARCHITECTURE AND INTEGRATION  
 BLOCK DIAGRAM

PROJECT NUMBER	CD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
19	2	4	7	0	1	2	3	0

SCALE: NTS



**LEGEND:**

- THREE POSITION SWITCH
- CIRCUIT BREAKER
- TRI-FURCATING JOINT
- Dyn11 DRY TYPE TRANSFORMER
- CABLE TERMINATION
- BUSBAR

**ABBREVIATIONS:**

R W B CONDUCTOR PHASING:  
 R = RED PHASE  
 W = WHITE PHASE  
 B = BLUE PHASE

AUX AUXILIARY  
 BB BUSBAR  
 CU COPPER  
 OEM ORIGINAL EQUIPMENT MANUFACTURER  
 TX TRANSFORMER  
 2S SYNCHRONISM CHECK  
 27 UNDERVOLTAGE  
 49 T WINDING TEMPERATURE  
 49 O OIL TEMPERATURE  
 50 INSTANTANEOUS OVERCURRENT  
 51 IDMT OVERCURRENT  
 50N INSTANTANEOUS EARTH FAULT  
 51N IDMT EARTH FAULT  
 59 OVER VOLTAGE  
 63 BUCHHOLTZ, PRESSURE RELIEF  
 81< OVER / UNDER FREQUENCY  
 87 DIFFERENTIAL  
 87L CABLE DIFFERENTIAL  
 87N RESTRICTED EARTH FAULT  
 80 ON-LOAD TAP CHANGER AUTOMATIC VOLTAGE CONTROL  
 VO INPUT - OUTPUT  
 ARC ARC-FLASH DETECTION  
 TRFR TRANSFORMER  
 OCTS OFF-CIRCUIT TAP SWITCH  
 OLTs ON-LOAD TAP SWITCH

AWAITING FINAL DESIGN INFORMATION FOR THE RESPECTIVE PACKAGES:

- CONVEYOR
- DUST EXTRACTION PLANT
- PROTECTION

MASTER  
 05 JUN 2018  
 AECOM TRANSNET

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

- NOTES**
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - 3.3 kV CIRCUIT BREAKER OPEN STATUS TO BE USED VIA DRY CONTACT IN PROTECTION RELAY FOR VSD CONTROLLING PROTECTION PURPOSES.
  - THE CONTRACTOR SHALL MAINTAIN CLOSE CO-ORDINATION WITH ANY OTHER APPLICABLE CONTRACTORS TO ENSURE THE CORRECT AND PROPER INTEGRATION OF THE ELECTRICAL SYSTEM.

PARTICULAR ATTENTION SHALL BE PAID TO THE INTEGRATION OF PROTECTION OF THE T3 BUILDING TRANSFORMER AND THE LV BUSBAR SYSTEM TO ENSURE ADEQUATE PROTECTION OF ALL ELEMENTS.

- ALL REQUIRED EQUIPMENT TO BE INSTALLED IN ENCLOSURE(S), MOUNTED ON THE MAIN TRANSFORMER ENCLOSURE, UNLESS OTHERWISE REQUIRED OR INSTRUCTED.
- REMOTE TRIPPING OF MV CB AT SUBSTATION M FOR PROTECTION OPERATION OF T3 TRANSFORMER (BUILDING) VIA REMOTE / MIRRORRED I/O.
- ARC PROTECTION SHALL BE APPLIED TO ALL AIR-INSULATED COMPARTMENTS. NO ARC DETECTION REQUIRED FOR SF6 GAS INSULATED COMPARTMENTS.

**AECOM**

CAPE TOWN OFFICE  
 WATERSIDE PLACE, SOUTH GATE  
 TYGER WATERFRONT  
 CARL CRONJE DRIVE  
 TEL: +27 (0)21 950 7500  
 FAX: +27 (0)21 950 7502  
 REG. NO. 1966/006628/07

ISSUED FOR CONSTRUCTION:

- NOTES REMOVED AND UPDATED.
- NEW NOTE 7 ADDED.
- HOLD POINT ADDED.
- NOTE 7 ADDED TO BUSBAR.
- PROTECTION TRIP NOTES UPDATED.
- ABBREVIATION LIST UPDATED.
- DUST EXTRACTION NOTE UPDATED.

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01		GB	LMB	CP	18-06-04
02		GB	LMB	CP	18-03-15

**REVISIONS**

This document including all design and information herein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	GB		18 06 04
				CHECKED	JF		18 06 04
				DESIGNED	LMB		18 06 04
				CHECKED	CP		18 06 04

OPERATING DIVISIONS			
TITLE	NAME	SIGN	DATE

PRE-ENG. / PRL TECH. / PPR. / ARCH  
 NAME: C PFM  
 SIGNATURE: [Signature]  
 REG. NUMBER: 2012/0736  
 DATE: 18 06 04

Transnet Capital Projects

**PORT OF SALDANHA**

IRON ORE TIPLER 3 PROJECT  
 BULK POWER UPGRADE:  
 SUBSTATION M  
 PROTECTION SCHEMATIC DIAGRAM

PROJECT NUMBER	ISSUE	DATE	DESCRIPTION
19247011	2	30	0

PROJECT NUMBER: 19247011 | ISSUE: 2 | DATE: 30 | DESCRIPTION: 0

SCALE: NTS



**LEGEND:**

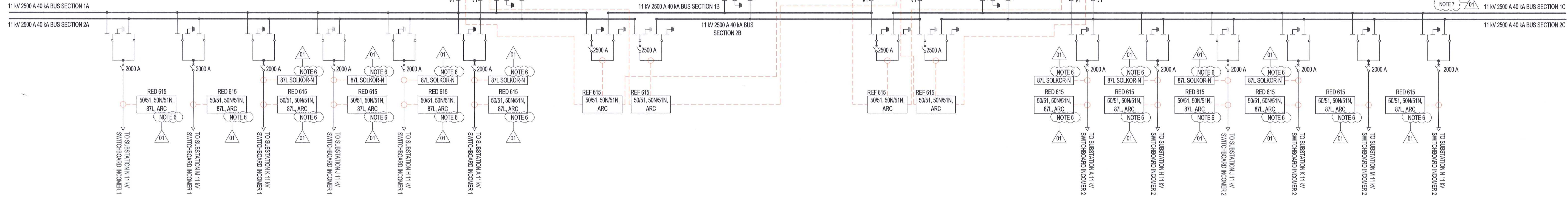
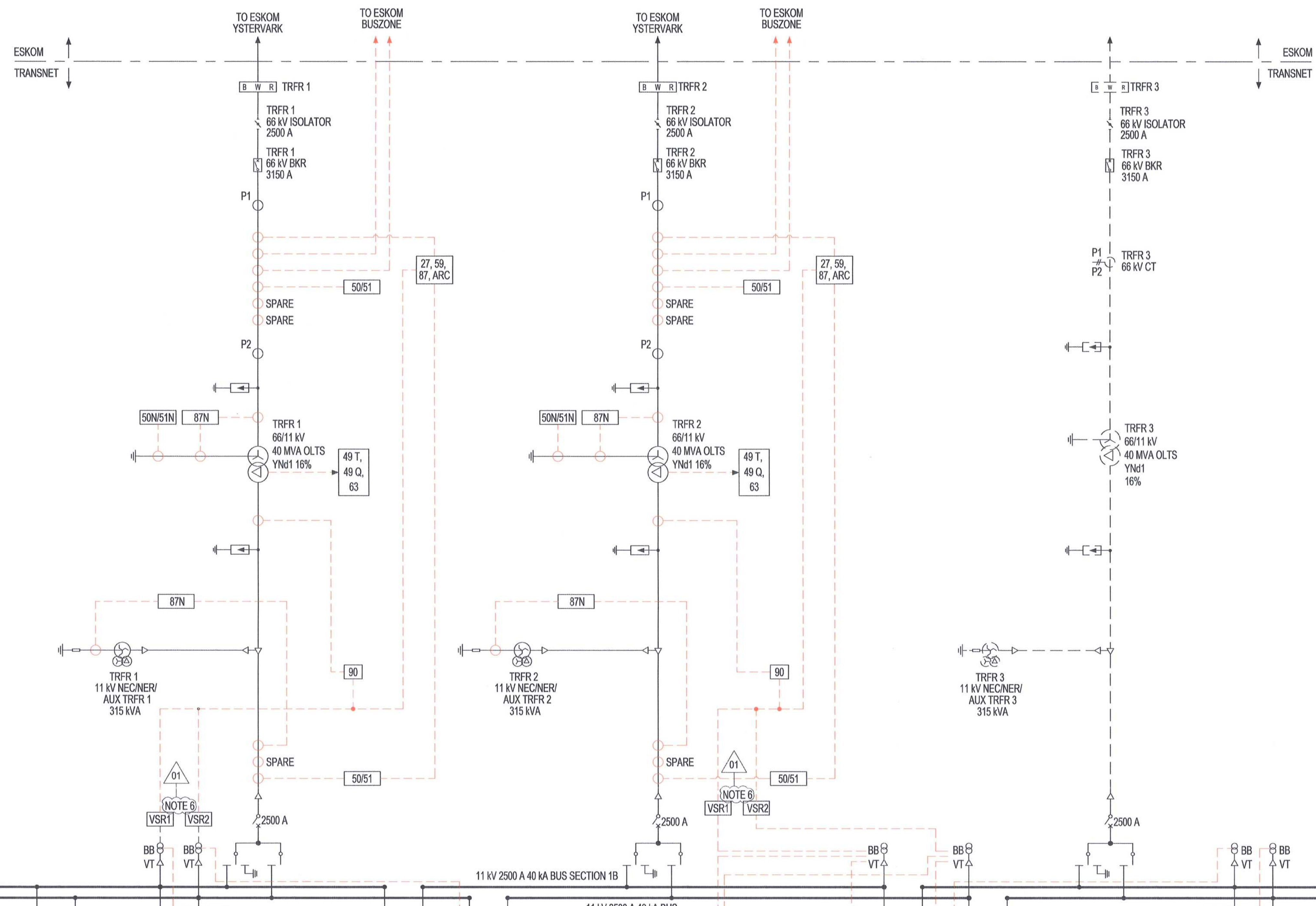
- THREE POSITION SWITCH
- CIRCUIT BREAKER
- YnM1 TRANSFORMER
- CABLE TERMINATION
- BUSBAR

**ABBREVIATIONS:**

R W B CONDUCTOR PHASING:  
 R = RED PHASE  
 W = WHITE PHASE  
 B = BLUE PHASE

AUX AUXILIARY  
 BB BUSBAR  
 CU COPPER  
 OEM ORIGINAL EQUIPMENT MANUFACTURER  
 TX TRANSFORMER  
 25 SYNCHRONISM CHECK  
 27 UNDERVOLTAGE  
 49 T WINDING TEMPERATURE  
 49 Q OIL TEMPERATURE  
 50 INSTANTANEOUS OVERCURRENT  
 51 EMAT OVERCURRENT  
 50M INSTANTANEOUS EARTH FAULT  
 51M EMAT EARTH FAULT  
 59 OVER VOLTAGE  
 63 BUCHHOLTZ PRESSURE RELIEF  
 81< UNDER / OVER FREQUENCY  
 87 DIFFERENTIAL  
 87L CABLE DIFFERENTIAL  
 87N RESTRICTED EARTH FAULT  
 90 ON-LOAD TAP CHANGER AUTOMATIC VOLTAGE CONTROL

IO INPUT - OUTPUT  
 ARC ARC FLASH DETECTION  
 TRFR TRANSFORMER  
 OCTS OFF-CIRCUIT TAP SWITCH  
 OLTS ON-LOAD TAP SWITCH



AWAITING FINAL DESIGN INFORMATION FOR THE RESPECTIVE PACKAGES:

- PROTECTION
- LOAD MANAGEMENT SYSTEM

**MASTER**  
 05 JUN 2018  
 AECOM TRANSNET

- NOTES**
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - EXISTING SOLKOR RELAYS AT EXISTING SUBSTATIONS TO BE REPLACED WITH SOLKOR-N RELAYS, AS SHOWN AND SPECIFIED.
  - THE CONTRACTOR SHALL MAINTAIN CLOSE CO-ORDINATION WITH ANY OTHER APPLICABLE CONTRACTORS TO ENSURE THE CORRECT AND PROPER INTEGRATION OF THE ELECTRICAL SYSTEM.
  - REMOTE CB STATUS OF SUBSTATIONS A, H, J, AND K ARE REQUIRED AT NEW MAIN INTAKE SUBSTATION. SHOULD IT NOT BE POSSIBLE TO MAP REMOTE STATUS TO LOCAL IED VIA REC 61850 / BINARY OUTPUTS / OTHER INTERNAL COMMS, EXTERNAL REMOTE / MIRRORING NO DEVICES MIGHT BE REQUIRED.
  - VOLTAGE SELECTION REQUIRED ON ALL FEEDERS - FOR PROTECTION AND METERING PURPOSES.
  - ARC PROTECTION SHALL BE APPLIED TO ALL AIR-INSULATED COMPARTMENTS. NO ARC DETECTION REQUIRED FOR SF6 GAS INSULATED COMPARTMENTS.

**AECOM**  
 CAPE TOWN OFFICE  
 WATERSIDE PLACE, SOUTH GATE  
 TYGER WATERFRONT  
 CARL CRONIE DRIVE  
 TEL: +27 (0)21 950 7500  
 FAX: +27 (0)21 950 7502  
 REG. No. 1964/006628/07

ISSUED FOR CONSTRUCTION:		OPERATING DIVISIONS:			
NO.	DESCRIPTION	BY	CHKD / APPD	DATE	
01	ISSUED FOR CONSTRUCTION:	GB	LMB	CP	18-06-04
NOTES REMOVED AND UPDATED: • NEW NOTE 7 ADDED. • HOLD POINT ADDED. • NOTE 7 ADDED TO BUSBAR. • ABBREVIATION LIST UPDATED.					
<b>REVISIONS</b> This document including all drawings and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.					

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	GB		18-06-04
				CHECKED	JF		18-06-04
				DESIGNED	LMB		18-06-04
				CHECKED	CP		18-06-04
OPERATING DIVISIONS:				PR. ENG. / PR. TECH. / PR. ARCH.			
TITLE	NAME	SIGN	DATE	NAME	C P/N	DATE	DATE
				SIGNATURE		18-06-04	
				REG. NUMBER	201270126		
				SCALE:	NTS		

Transnet Capital Projects  
 TABLE BAY BUILDING, TYGERSBERG PARK, 165 LYS WEGE DRIVE, PLATTENBERG, 6001  
 TEL: 021 940 9999  
 FAX: 021 947 2955

**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT**  
**BULK POWER UPGRADE:**  
**NEW MAIN INTAKE SUBSTATION**  
**PROTECTION SCHEMATIC DIAGRAM**

PROJECT NUMBER	DD	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	BY	AD								
A01	9	2	4	7	0	1	2	3	0	0	0	8	0	1	0	1	AE

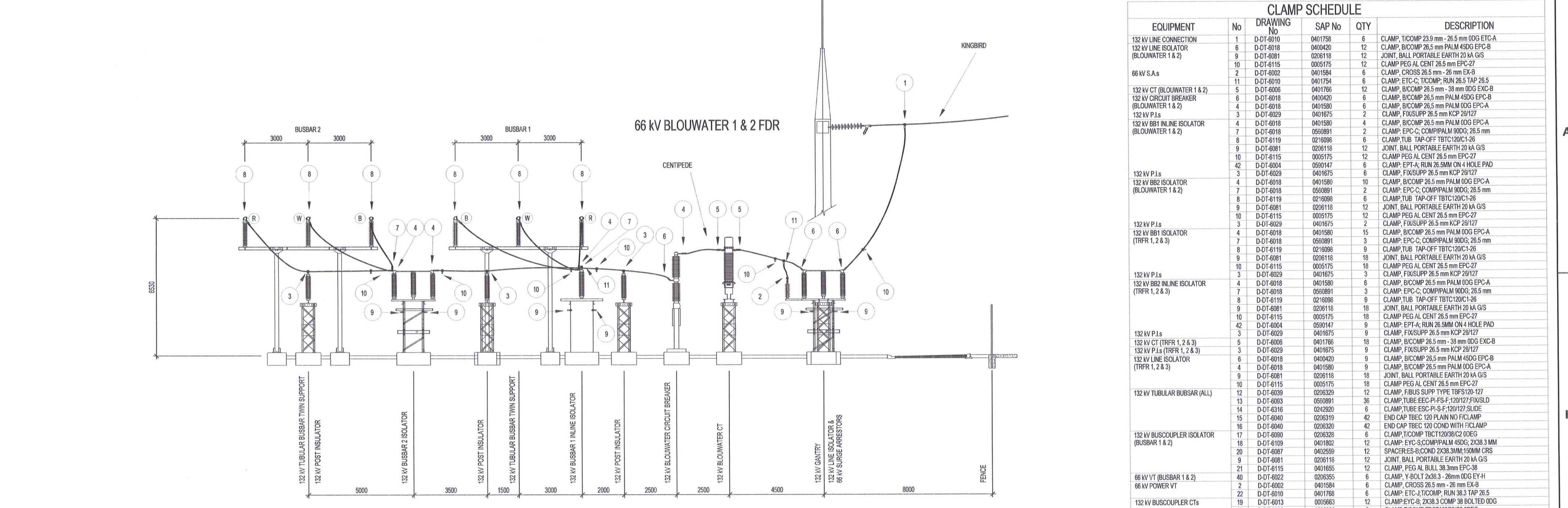
DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

**TRANSNET NEW MAIN INTAKE SUBSTATION CLAMP SCHEDULE**

EQUIPMENT	No	D-DT-DRAWING	SAP No	QTY	DESCRIPTION
132 kV CT (TRANSFORMER 1 & 2)	25	D-01-6008	0401766	12	CLAMP, BICOMP 26.5 mm - 38 mm IGG EPC-B
132 kV CIRCUIT BREAKER (TRANSFORMER 1 & 2)	26	D-01-6018	040420	6	CLAMP, BICOMP 26.5 mm PALM IGG EPC-B
132 kV TRANSFORMER ISOLATOR (TRANSFORMER 1 & 2)	27	D-01-6018	0401980	18	CLAMP, BICOMP 26.5 mm PALM IGG EPC-A
132 kV TRANSFORMER ISOLATOR (TRANSFORMER 1 & 2)	28	D-01-6081	0206118	12	JOINT, BALL PORTABLE EARTH 20 tA G/S
132 kV P.I.s	29	D-01-6115	0005175	6	CLAMP, PEG AL CENT 26.5 mm EPC-26
11 kV CABLE END SUPPORT (TRANSFORMER 1 & 2)	30	D-01-6090	0200328	6	CLAMP, TICOMP TRCT12009C2 00EG ETP-TE-4.2.F0
66 kV P.I.s	31	D-01-6022	0206978	12	CLAMP, TICOMP TRCT1201019 ETP-PL-H-C
66 kV P.I.s	32	D-01-6063	0402920	6	CLAMP, TUBE 120127 SLIDE ESC-P1-F-120127 SLIDE
66 kV P.I.s	33	D-01-6039	0219262	6	CLAMP, TUBE, ESC-P1-F-1.FXED
66 kV P.I.s	34	D-01-6040	0206319	12	END CAP TBEC 120 PLAN NO FICLAMP EEC-PL-C
66 kV TRANSFORMER (TRANSFORMER 1 & 2)	35	D-01-6065	0401752	6	CLAMP, FUSPT 38.3 mm P28 I27150 CC
66 kV TRANSFORMER (TRANSFORMER 1 & 2)	36	D-01-6013	0401772	6	CLAMP, BICOMP 26.5 mm - 28 mm IGG EPC-A
66 kV S.A.s	37	D-01-6022	0401984	6	CLAMP, CROSS 38 mm - 28 mm EX-B
11 kV S.A.s	38	D-01-6022	0005831	6	CLAMP, CROSS 38 mm - 28 mm EY-B
11 kV S.A.s	39	D-01-6022	0401669	12	CLAMP, FUSPT 38.3 mm P28 I27150 CC

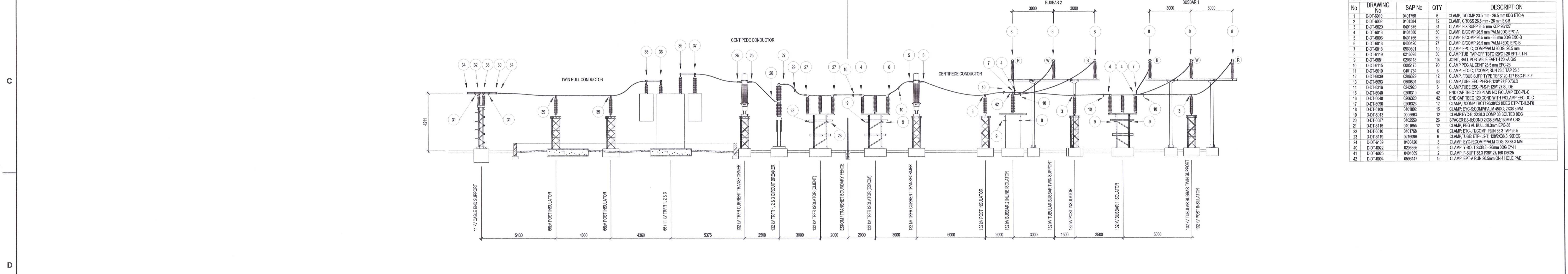
**CLAMP TOTAL SUMMARY**

No	D-DT-DRAWING	SAP No	QTY	DESCRIPTION
25	D-01-6008	0401766	12	CLAMP, BICOMP 26.5 mm - 38 mm IGG EPC-B
26	D-01-6018	040420	6	CLAMP, BICOMP 26.5 mm PALM IGG EPC-B
27	D-01-6018	0401980	18	CLAMP, BICOMP 26.5 mm PALM IGG EPC-A
28	D-01-6081	0206118	12	JOINT, BALL PORTABLE EARTH 20 tA G/S
29	D-01-6115	0005175	6	CLAMP, PEG AL CENT 26.5 mm EPC-26
30	D-01-6090	0200328	6	CLAMP, TICOMP TRCT12009C2 00EG ETP-TE-4.2.F0
31	D-01-6022	0206978	12	CLAMP, TICOMP TRCT1201019 ETP-PL-H-C
32	D-01-6063	0402920	6	CLAMP, TUBE 120127 SLIDE ESC-P1-F-120127 SLIDE
33	D-01-6039	0219262	6	CLAMP, TUBE, ESC-P1-F-1.FXED
34	D-01-6040	0206319	12	END CAP TBEC 120 PLAN NO FICLAMP EEC-PL-C
35	D-01-6065	0401752	6	CLAMP, FUSPT 38.3 mm P28 I27150 CC
36	D-01-6013	0401772	6	CLAMP, BICOMP 26.5 mm - 28 mm IGG EPC-A
37	D-01-6022	0401984	6	CLAMP, CROSS 38 mm - 28 mm EX-B
38	D-01-6022	0005831	6	CLAMP, CROSS 38 mm - 28 mm EY-B
39	D-01-6022	0401669	12	CLAMP, FUSPT 38.3 mm P28 I27150 CC

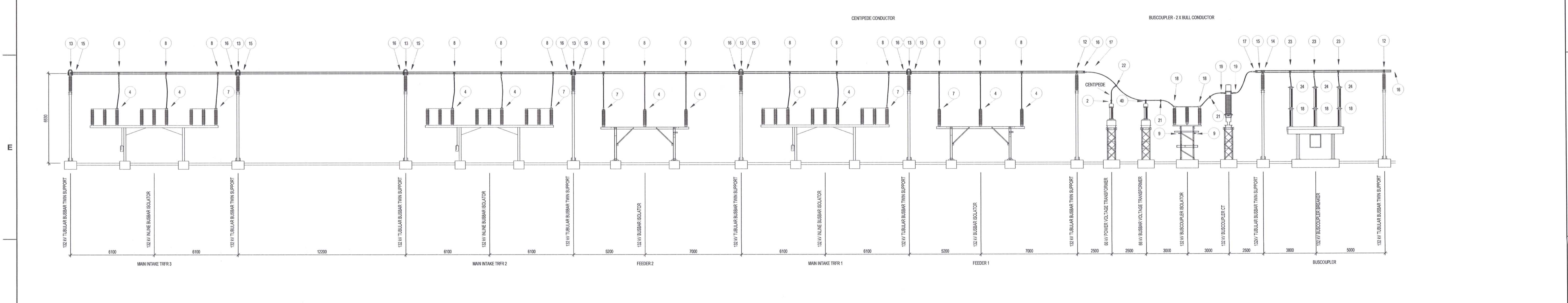


**NEW MAIN INTAKE SUBSTATION 66 / 11 kV TRFR 1 & 2**

**YSTERVARK 66 kV TRFR 1 & 2**



**66 kV BUSCOUPLER AND BUSBAR 2 SECTION**



**66 kV BUSCOUPLER AND BUSBAR 2 SECTION**

**CLAMP SCHEDULE**

EQUIPMENT	No	DRAWING	SAP No	QTY	DESCRIPTION
132 kV LINE CONNECTION	1	D-01-6010	0401766	6	CLAMP, TICOMP 26.5 mm - 26.5 mm IGG EPC-A
132 kV LINE ISOLATOR (BLOWWATER 1 & 2)	6	D-01-6018	040420	12	CLAMP, BICOMP 26.5 mm PALM IGG EPC-B
66 kV S.A.s	9	D-01-6081	0206118	12	JOINT, BALL PORTABLE EARTH 20 tA G/S
132 kV CT (BLOWWATER 1 & 2)	2	D-01-6008	0401766	12	CLAMP, BICOMP 26.5 mm - 38 mm IGG EPC-B
132 kV CIRCUIT BREAKER (BLOWWATER 1 & 2)	3	D-01-6018	040420	6	CLAMP, BICOMP 26.5 mm PALM IGG EPC-A
132 kV P.I.s	4	D-01-6115	0005175	6	CLAMP, PEG AL CENT 26.5 mm EPC-26
132 kV BEB LINE ISOLATOR (BLOWWATER 1 & 2)	7	D-01-6018	0401980	18	CLAMP, BICOMP 26.5 mm PALM IGG EPC-A
132 kV P.I.s	8	D-01-6115	0005175	6	CLAMP, PEG AL CENT 26.5 mm EPC-26
132 kV CT (BLOWWATER 1 & 2)	25	D-01-6008	0401766	12	CLAMP, BICOMP 26.5 mm - 38 mm IGG EPC-B
132 kV CIRCUIT BREAKER (BLOWWATER 1 & 2)	26	D-01-6018	040420	6	CLAMP, BICOMP 26.5 mm PALM IGG EPC-B
132 kV TRANSFORMER ISOLATOR (BLOWWATER 1 & 2)	27	D-01-6018	0401980	18	CLAMP, BICOMP 26.5 mm PALM IGG EPC-A
132 kV TRANSFORMER ISOLATOR (BLOWWATER 1 & 2)	28	D-01-6081	0206118	12	JOINT, BALL PORTABLE EARTH 20 tA G/S
132 kV P.I.s	29	D-01-6115	0005175	6	CLAMP, PEG AL CENT 26.5 mm EPC-26
11 kV CABLE END SUPPORT (TRANSFORMER 1 & 2)	30	D-01-6090	0200328	6	CLAMP, TICOMP TRCT12009C2 00EG ETP-TE-4.2.F0
66 kV P.I.s	31	D-01-6022	0206978	12	CLAMP, TICOMP TRCT1201019 ETP-PL-H-C
66 kV P.I.s	32	D-01-6063	0402920	6	CLAMP, TUBE 120127 SLIDE ESC-P1-F-120127 SLIDE
66 kV P.I.s	33	D-01-6039	0219262	6	CLAMP, TUBE, ESC-P1-F-1.FXED
66 kV TRANSFORMER (TRANSFORMER 1 & 2)	35	D-01-6065	0401752	6	CLAMP, FUSPT 38.3 mm P28 I27150 CC
66 kV TRANSFORMER (TRANSFORMER 1 & 2)	36	D-01-6013	0401772	6	CLAMP, BICOMP 26.5 mm - 28 mm IGG EPC-A
66 kV S.A.s	37	D-01-6022	0401984	6	CLAMP, CROSS 38 mm - 28 mm EX-B
11 kV S.A.s	38	D-01-6022	0005831	6	CLAMP, CROSS 38 mm - 28 mm EY-B
11 kV S.A.s	39	D-01-6022	0401669	12	CLAMP, FUSPT 38.3 mm P28 I27150 CC

**CLAMP TOTAL SUMMARY**

No	DRAWING	SAP No	QTY	DESCRIPTION
1	D-01-6010	0401766	6	CLAMP, TICOMP 26.5 mm - 26.5 mm IGG EPC-A
2	D-01-6008	0401766	12	CLAMP, BICOMP 26.5 mm - 38 mm IGG EPC-B
3	D-01-6018	040420	6	CLAMP, BICOMP 26.5 mm PALM IGG EPC-B
4	D-01-6018	0401980	18	CLAMP, BICOMP 26.5 mm PALM IGG EPC-A
5	D-01-6008	0401766	12	CLAMP, BICOMP 26.5 mm - 38 mm IGG EPC-B
6	D-01-6018	040420	6	CLAMP, BICOMP 26.5 mm PALM IGG EPC-B
7	D-01-6018	0401980	18	CLAMP, BICOMP 26.5 mm PALM IGG EPC-A
8	D-01-6018	0401980	18	CLAMP, BICOMP 26.5 mm PALM IGG EPC-A
9	D-01-6081	0206118	12	JOINT, BALL PORTABLE EARTH 20 tA G/S
10	D-01-6115	0005175	6	CLAMP, PEG AL CENT 26.5 mm EPC-26
11	D-01-6090	0200328	6	CLAMP, TICOMP TRCT12009C2 00EG ETP-TE-4.2.F0
12	D-01-6022	0206978	12	CLAMP, TICOMP TRCT1201019 ETP-PL-H-C
13	D-01-6063	0402920	6	CLAMP, TUBE 120127 SLIDE ESC-P1-F-120127 SLIDE
14	D-01-6039	0219262	6	CLAMP, TUBE, ESC-P1-F-1.FXED
15	D-01-6040	0206319	12	END CAP TBEC 120 PLAN NO FICLAMP EEC-PL-C
16	D-01-6065	0401752	6	CLAMP, FUSPT 38.3 mm P28 I27150 CC
17	D-01-6013	0401772	6	CLAMP, BICOMP 26.5 mm - 28 mm IGG EPC-A
18	D-01-6022	0401984	6	CLAMP, CROSS 38 mm - 28 mm EX-B
19	D-01-6022	0005831	6	CLAMP, CROSS 38 mm - 28 mm EY-B
20	D-01-6022	0401669	12	CLAMP, FUSPT 38.3 mm P28 I27150 CC
21	D-01-6018	0401980	18	CLAMP, BICOMP 26.5 mm PALM IGG EPC-A
22	D-01-6018	0401980	18	CLAMP, BICOMP 26.5 mm PALM IGG EPC-A
23	D-01-6018	0401980	18	CLAMP, BICOMP 26.5 mm PALM IGG EPC-A
24	D-01-6018	0401980	18	CLAMP, BICOMP 26.5 mm PALM IGG EPC-A
25	D-01-6008	0401766	12	CLAMP, BICOMP 26.5 mm - 38 mm IGG EPC-B
26	D-01-6018	040420	6	CLAMP, BICOMP 26.5 mm PALM IGG EPC-B
27	D-01-6018	0401980	18	CLAMP, BICOMP 26.5 mm PALM IGG EPC-A
28	D-01-6081	0206118	12	JOINT, BALL PORTABLE EARTH 20 tA G/S
29	D-01-6115	0005175	6	CLAMP, PEG AL CENT 26.5 mm EPC-26
30	D-01-6090	0200328	6	CLAMP, TICOMP TRCT12009C2 00EG ETP-TE-4.2.F0
31	D-01-6022	0206978	12	CLAMP, TICOMP TRCT1201019 ETP-PL-H-C
32	D-01-6063	0402920	6	CLAMP, TUBE 120127 SLIDE ESC-P1-F-120127 SLIDE
33	D-01-6039	0219262	6	CLAMP, TUBE, ESC-P1-F-1.FXED
34	D-01-6040	0206319	12	END CAP TBEC 120 PLAN NO FICLAMP EEC-PL-C
35	D-01-6065	0401752	6	CLAMP, FUSPT 38.3 mm P28 I27150 CC
36	D-01-6013	0401772	6	CLAMP, BICOMP 26.5 mm - 28 mm IGG EPC-A
37	D-01-6022	0401984	6	CLAMP, CROSS 38 mm - 28 mm EX-B
38	D-01-6022	0005831	6	CLAMP, CROSS 38 mm - 28 mm EY-B
39	D-01-6022	0401669	12	CLAMP, FUSPT 38.3 mm P28 I27150 CC

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

**PREPARATION OF TERMINALS, CLAMPS AND CONDUCTORS.**

- WIPE THE MATING SURFACES FREE FROM GREASE AND DIRT.
- APPLY 1 mm THICK COATING OF AN ELECTRICALLY AND NON-OXIDISING HIGH TEMPERATURE GREASE TO THE SURFACES OF THE CLAMPS USING A NON-METALLIC SPATULA OR SIMILAR TOOL.
- SCRUB ALL THE COATED SURFACES THOROUGHLY WITH A WIRE BRUSH WHICH HAS BEEN USED SOLELY FOR THIS PURPOSE.
- WIPE OFF THE JOINTING COMPOUND.
- APPLY A FRESH 2 mm THICK COATING OF CONTACT GREASE PRIOR TO ATTACHING THE CLAMP.
- ALL CLAMP BOLTS TO BE TIGHTENED TO THE ACCEPTED INITIAL TORQUE VALUES.

**REFERENCE DRAWINGS**

DRAWING NO.	REFERENCE
1	
2	
3	
4	
5	
6	
7	
8	

**MASTER**

**07 JUN 2018**

AECOM TRANSNET

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1966/006628/07

**CONTRACTOR / CONSULTANT**

TITLE	NAME	SIGN	DATE	
ISSUED FOR CONSTRUCTION	GB	BS	CP	18-06-06
ISSUED FOR CONSTRUCTION	JF	BS	CP	18-06-06
ISSUED FOR CONSTRUCTION	BY	CHKD	APPD	DATE

**OPERATING DIVISIONS**

TITLE	NAME	SIGN	DATE
PRENG / PR.TECH/PR. ARCH			
SIGNATURE			
REG. NUMBER	2012/0126		
SCALE:	1:100		

**TRANSNET CAPITAL PROJECTS**

TRANSNET LTD (FORMERLY TRANSNET CAPITAL PROJECTS) REG. NO. 196628/006

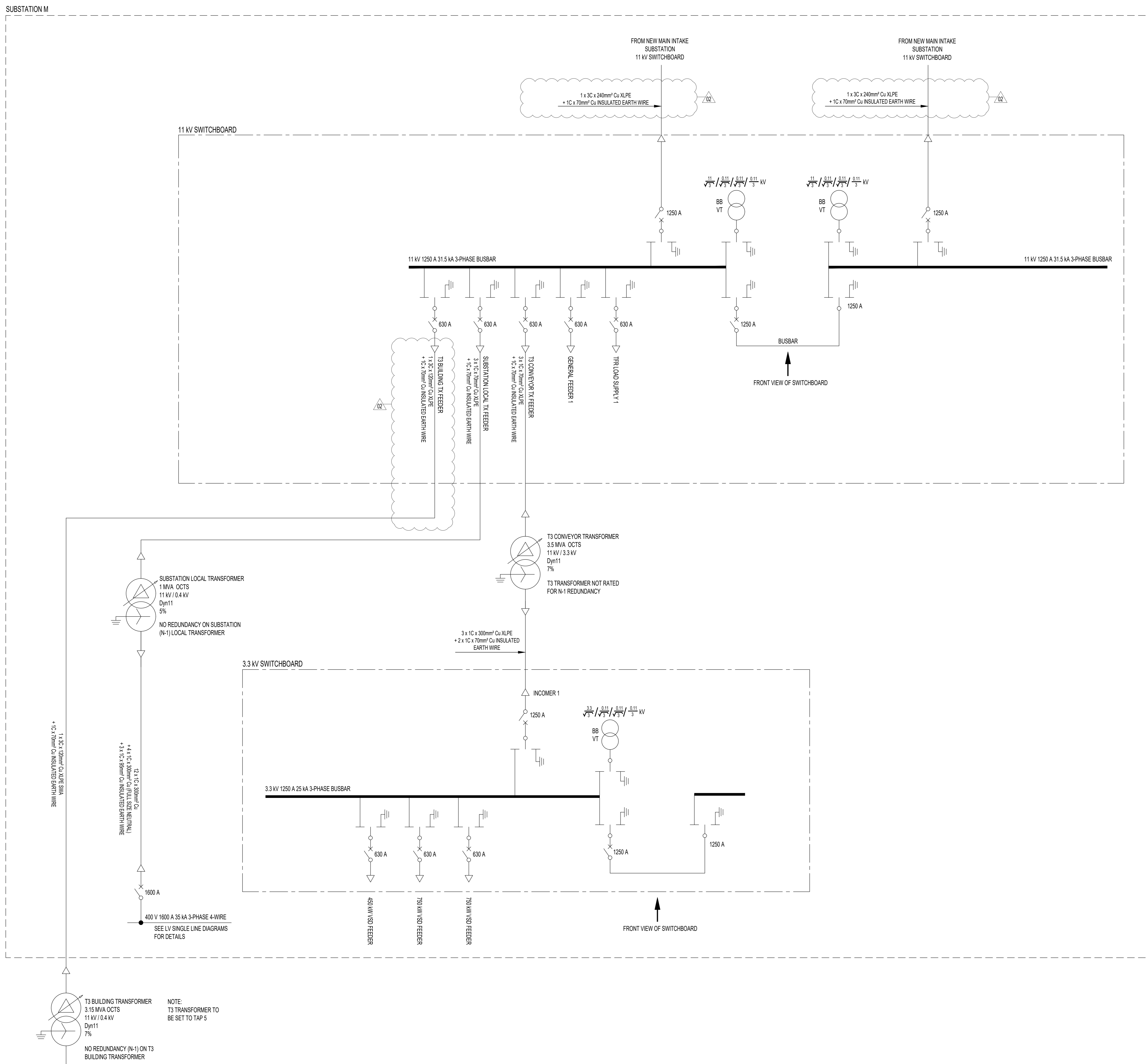
TABLE BAY BUILDING, TYGERBERG PARK,  
163 LYS VORGE DRIVE, PLATTEKLOOF,  
8001

**IRON ORE TIPPLER 3 PROJECT**  
BULK POWER UPGRADE:  
NEW MAIN INTAKE SUBSTATION  
SECTIONS

**TRANSNET**

PROJECT NUMBER	OD	FRS	DHS	TYPE	DRAWING NO.	SHEET	REV	ID
AQ1924701	2	3	0	E	S	1011	011	011





- NOTES:**
- SEE SPECIFICATIONS FOR TERMINATIONS OF SWITCHGEAR.
  - SEE SPECIFICATIONS FOR CABLE PLUGS AND TERMINATIONS FOR TRANSFORMER ENCLOSURE BOXES.
  - ALL POWER CABLES INTERNAL TO THE SUBSTATION TO BE UNARMoured.
  - ALL POWER CABLES EXTERNAL TO THE SUBSTATION TO BE ARMoured.



**CAPE TOWN OFFICE**  
 WATERFORD PLACE, SOUTH GATE  
 TYGER WATERFRONT  
 CARL CRONJE DRIVE  
 TEL: +27 (0)21 950 7500  
 FAX: +27 (0)21 950 7502  
 REG. No. 1966/006628/07

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
02	ISSUED FOR CONSTRUCTION: • TRIPURCATION JOINTS AND SINGLE CORE MV CABLE OMITTED WITH 3C MULTI-CORE INSTALLED FROM END-TO-END	DD	JW	CP	21-11-30
01	ISSUED FOR CONSTRUCTION: • HOLD POINT ADDED. • REMOVED 3.3 kV VT FROM FEEDER. • QUANTITY CHANGED. • NOTES REMOVED AND UPDATED. • UPDATED CONDUCTOR SIZE	GB	DA	CP	18-06-06
00	ISSUED FOR CONSTRUCTION	GB	DA	BS	18-03-15

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS					
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	DD		21-11-30
				CHECKED	KS		21-11-30
				DESIGNED	CP		21-11-30
				CHECKED	JW		21-11-30
OPERATING DIVISIONS							
TITLE	NAME	SIGN	DATE	PR. ENG. / PR. TECH.	PR. ARCH	NAME	DATE

Transnet Capital Projects

**TRANSNET**

TRANSNET LTD (TRADING AS TRANSNET CAPITAL PROJECTS) REG. NO. 199000000000  
 TABLE BAY BUILDINGS, TYGERSBERG PARK, TEL: 021 940 1999  
 163 LUYK KRIGER DRIVE, PLATTEKLOOF, FAX: 086 677 2425  
 8001

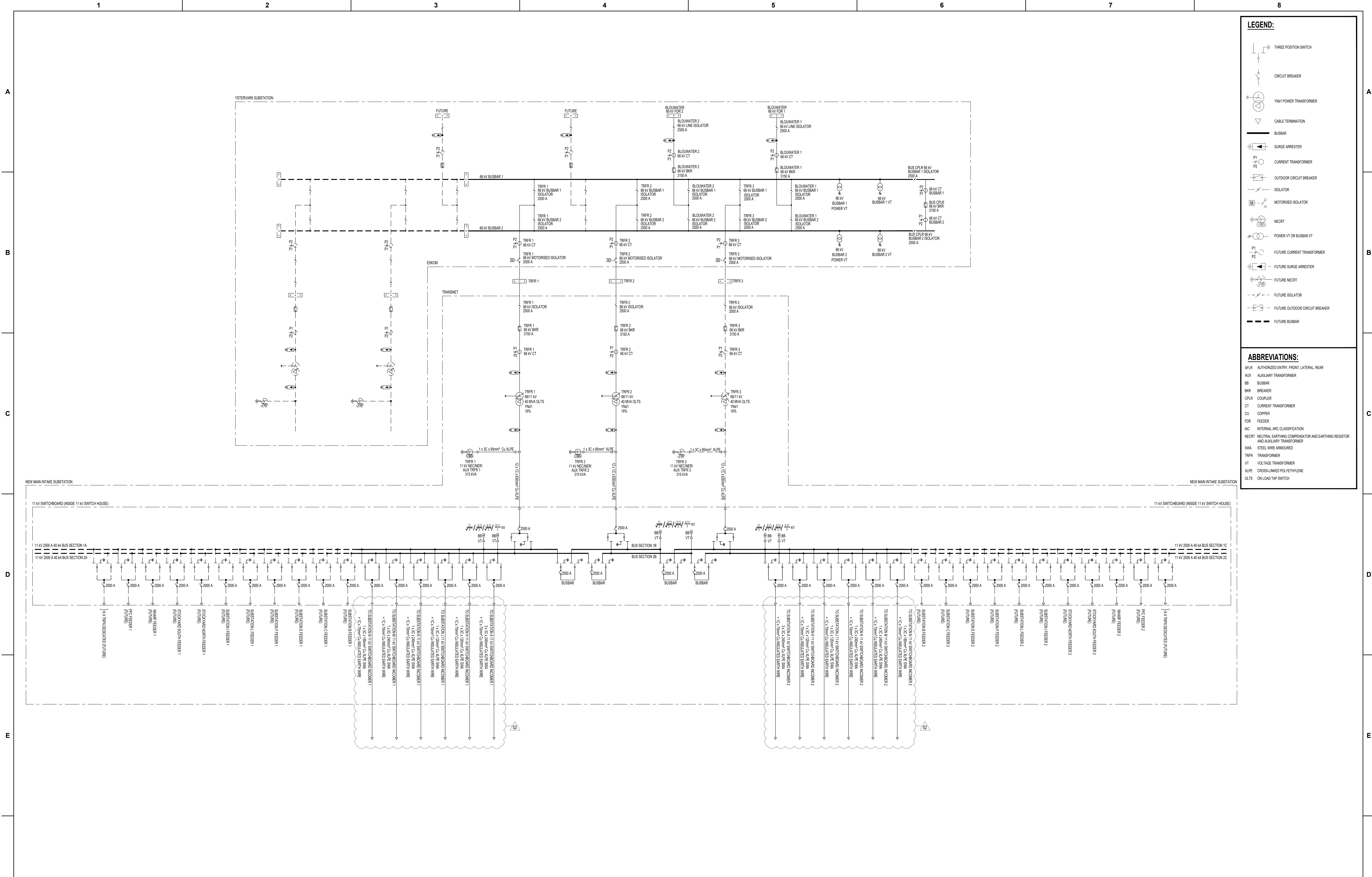
**PORT OF SALDANHA**

IRON ORE TIPPLER 3 PROJECT  
 BULK ELECTRICAL POWER UPGRADE:  
 SUBSTATION M  
 MV SINGLE LINE DIAGRAM

PROJECT NUMBER	ID	FBS	DIB	TYPE	DRAWING NO.	SHEET	REV	ID
19	2	4	7	0	1	2	3	0
					E	S	L	0
					0	0	5	0
					1	0	2	AE

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS





CONTRACTOR / CONSULTANT	TRANSNET CAPITAL PROJECTS
TITLE	NAME SIGN DATE
DRAWN	DD 21 11 30
CHECKED	KS 21 11 30
DESIGNED	CP 21 11 30
CHECKED	JW 21 11 30
OPERATING DIVISIONS	
TITLE	NAME SIGN DATE
PR. ENG. / PR. TECH. / PR. ARCH	NAME DATE
SIGNATURE	DATE
REG. NUMBER	201270126
SCALE:	NTS

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- SEE SPECIFICATIONS FOR TERMINATIONS ON 11kV SWITCHGEAR.
- 11 kV SWITCHGEAR SHALL BE OF THE FIXED PATTERN GAS INSULATED TYPE WITH FIXED VACUUM CIRCUIT BREAKERS AND MOTORIZED THREE POSITION SWITCHES. THE 11 kV SWITCHGEAR SHALL BE INTERNAL ARC CLASSIFIED (IAC) AFLR 25 kA FOR 1 SECOND IN ACCORDANCE WITH SANS 62271-200. THE 11 kV SWITCHBOARD SHALL BE OF THE DOUBLE BUSBAR DESIGN.

5. ALL POWER CABLES INTERNAL TO THE SUBSTATION YARD AND BUILDING TO BE UNARMoured. ALL CABLES EXITING THE SUBSTATION BUILDING TO BE ARMoured, UNLESS OTHERWISE SPECIFIED.

**AECOM**

CAPE TOWN OFFICE  
WATERDE PLAZA, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1966/006628/07

PROJECT NUMBER	DO	FBS	DHS	TYPE	DRAWING NO.	SHEET	REV	ID
AO	1	9	2	4	7	0	1	2

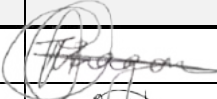

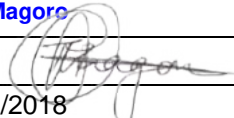
**TRANSNET**

TRANSNET CAPITAL PROJECTS  
TABLE BAY BUILDING, TYGERSBERG PARK  
163 LUYKSRIG DRIVE, PLATTEKLOOF, 8001  
TEL: 021 940 1999  
FAX: 021 940 2425

**PORT OF SALDANHA**

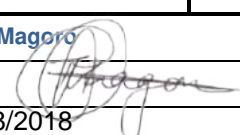
**IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE:  
NEW MAIN INTAKE SUBSTATION  
SINGLE LINE DIAGRAM**

**SQUAD CHECK FORM**

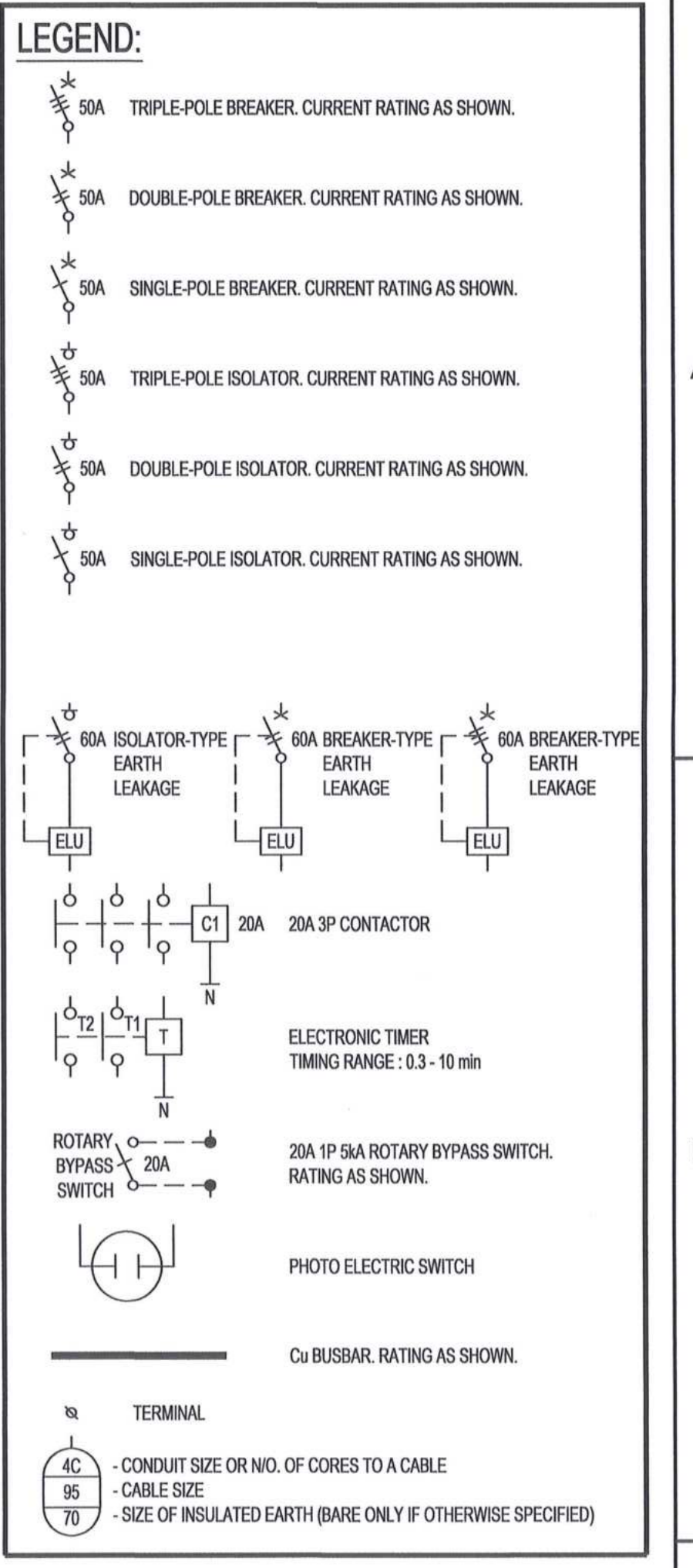
Location		<b>Saldanha</b>			Squad Check Number		<b>1924701.E004-SQ-0034</b>		
Title		<b>Substation M: Single Line Diagram: Main Distribution Board (MDB)</b>			Contract No.		<b>E004</b>		
Project Name		<b>Installation of the 3rd Tippler at the Port of Saldanha</b>			Project No.		<b>1924701</b>		
Document No.		<b>1924701-2-300-E-SL-0009-01-01</b>			Revision		<b>01</b>		
Discipline	Reviewer's Name	Reviewer's Signature	Date	Mandatory	Optional	Accepted	Accepted with Comments	Rejected	Information
	Thulane Magoro		30/08/2018				X		
	Bonga Ntshangase		30/08/2018				X		
	TNPA						X		
<b>REVIEW STATUS (Assigned by Responsible Project Manager)</b>									
C 1	<input type="checkbox"/>	ACCEPTED			C 3	<input type="checkbox"/>	REJECTED		
C 2	<input checked="" type="checkbox"/>	ACCEPTED WITH COMMENTS (REVISE & SUBMIT)			C 4	<input type="checkbox"/>	INFORMATION		
<b>SIGNED BY:</b>  <b>RESPONSIBLE PROJECT MANAGER</b>				Print Name	<b>TR Magoro</b>				
				Signature					
				Date	30/08/2018				
<i>This review is only for general conformance with the design concept of the Project and general compliance with the information given in the contract documents</i>									



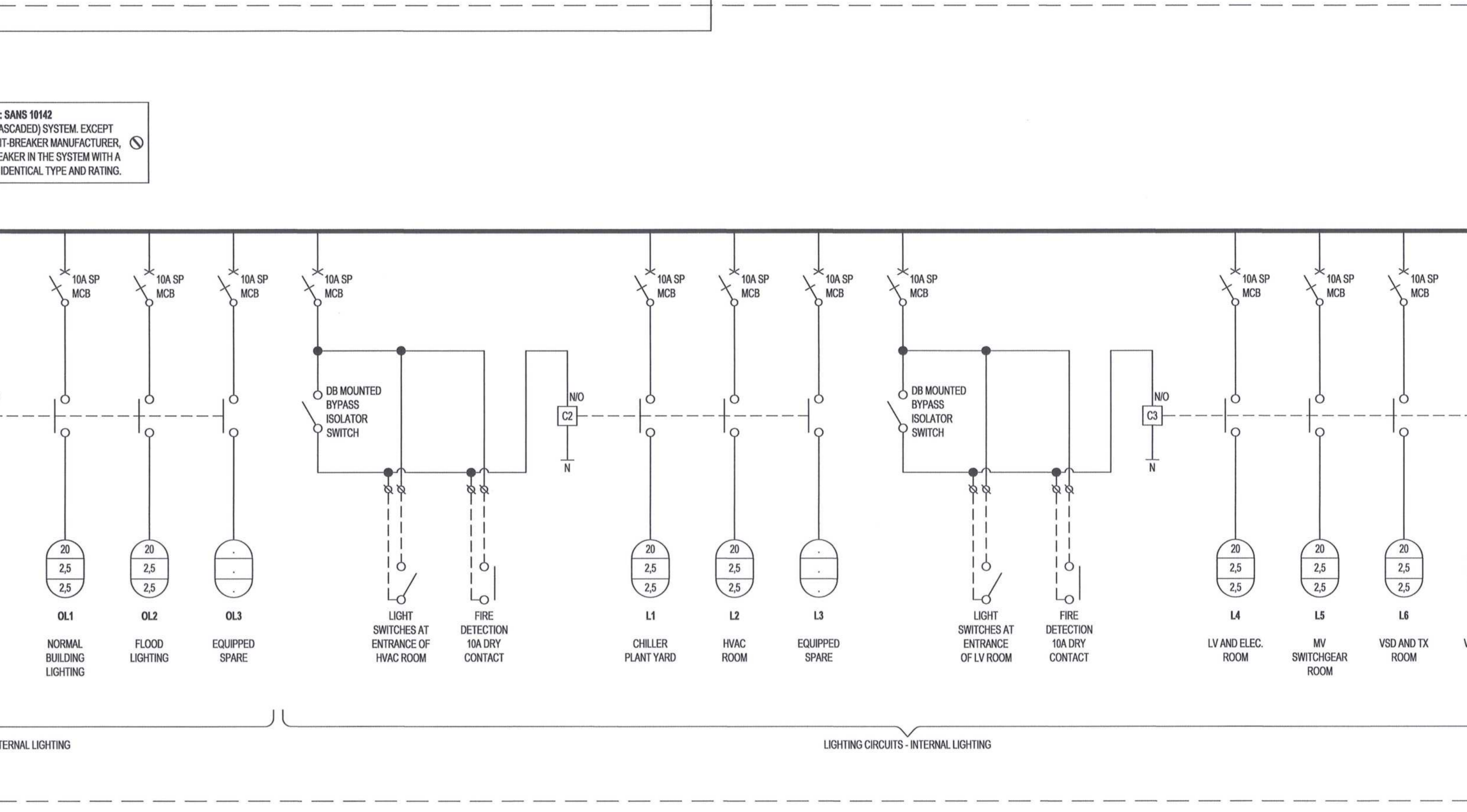
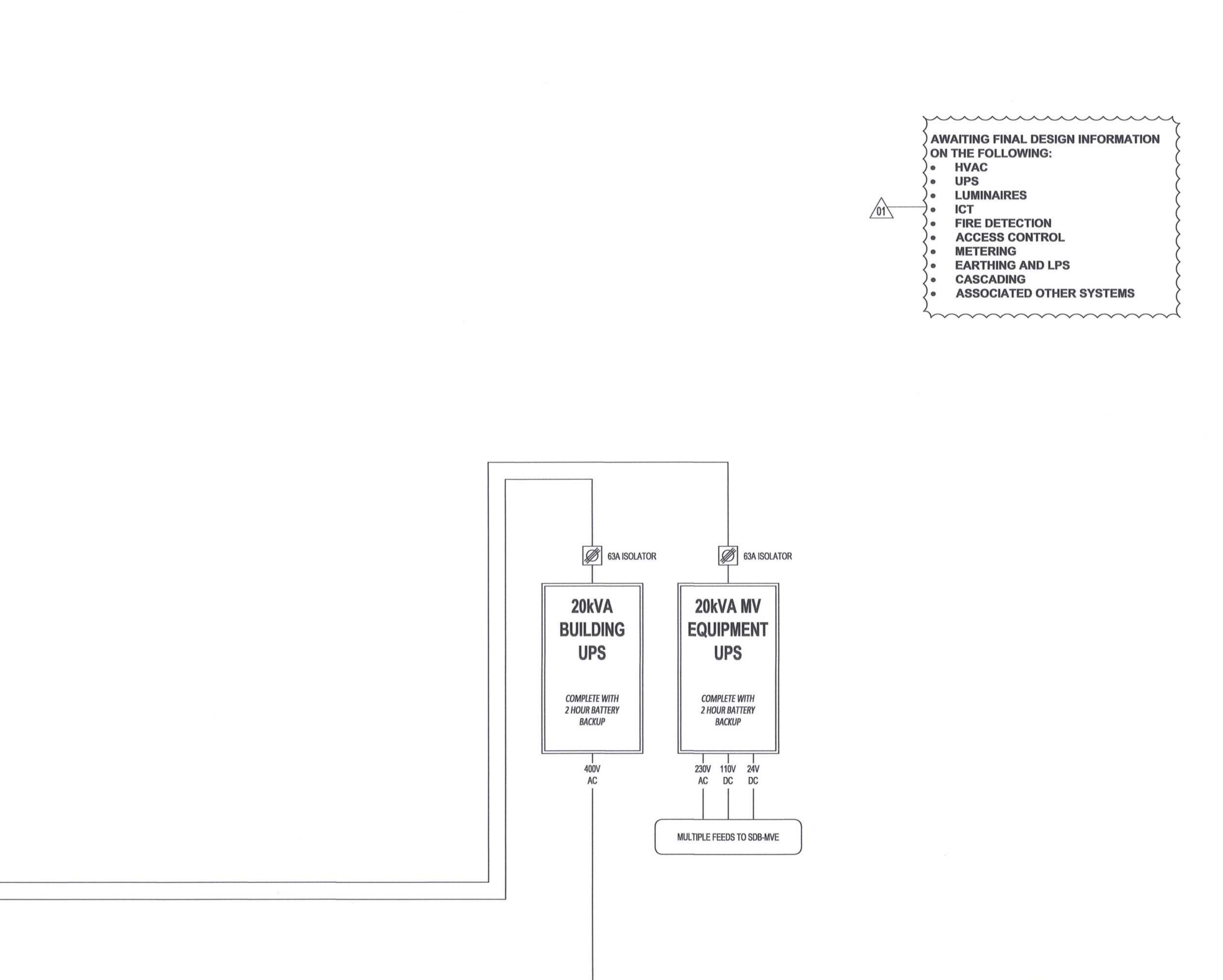
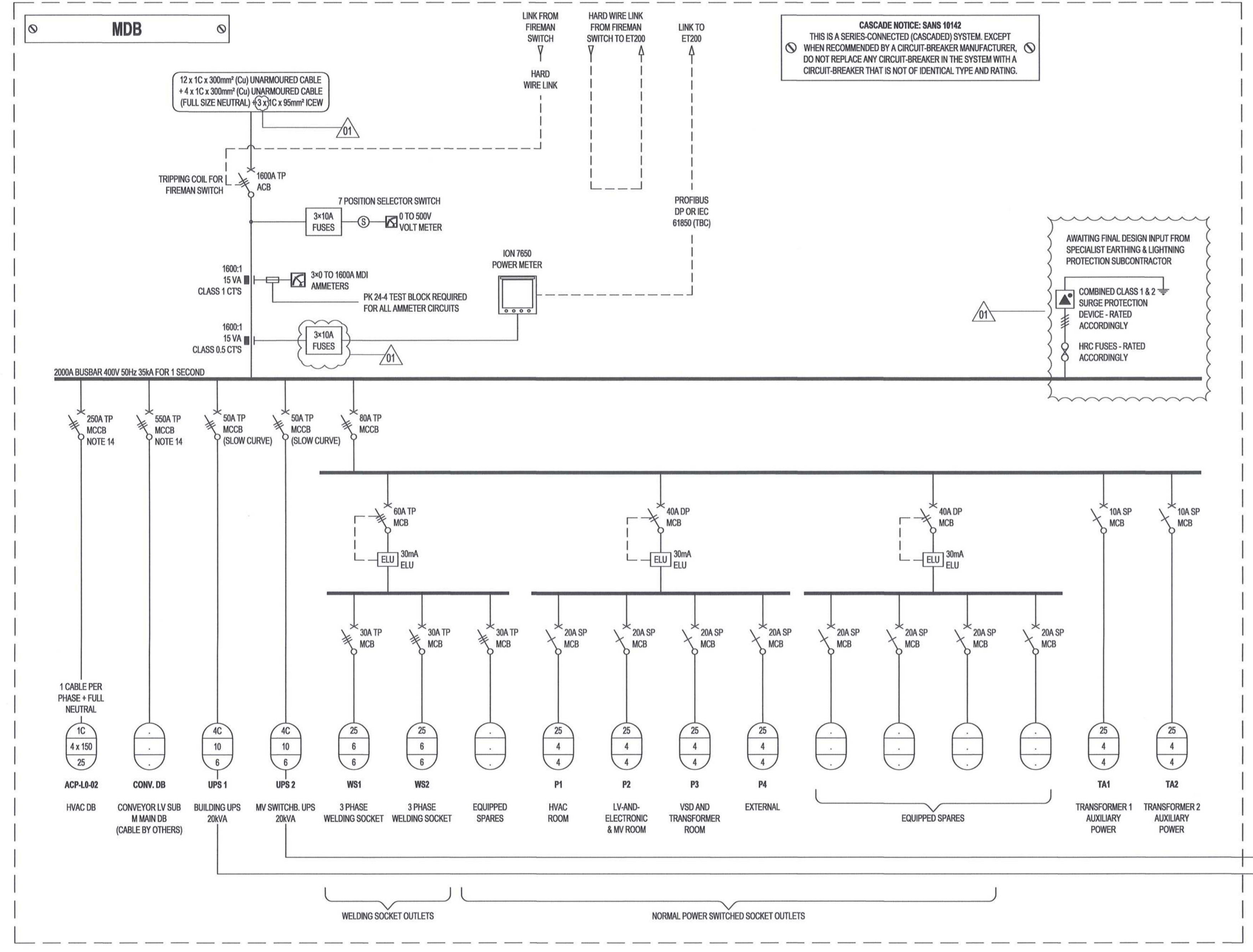
**SQUAD CHECK COMMENT SHEET**

		Project / Contract No.	Squad Check No.
		1924701-E004	1924701.E004-SQ-0034
Comments	Name of Discipline	Action Taken by Responsible PM	
1.Prefer an intelligent timer or PLC to control the contactor due to maintenance concerns.			
2.Philosophy behind operation of fire detection contacts			
<b>SIGNED BY:  RESPONSIBLE PROJECT MANAGER</b>	Print Name	TR Magoro	
	Signature	PP 	
	Date	30/08/2018	
<i>This comment sheet must always accompany the front cover sheet (Squad Check Form) once signed off</i>			

REQUIREMENTS FOR THIS PANEL	DB MOUNTING	IP RATING	MATERIAL TYPE	MATERIAL THICKNESS	CLOUR	HINGES	DOORS AND ACCESS	LV SUPPLY CABLE ENTRY	MIN DISTANCES FOR CABLE TERMINATIONS	EARTHING	BUSBARS
MAIN CIRCUIT BREAKER 1	RECESSED	IP35	POLYETHYLENE	12mm	MAIN SECTION - ELECTRIC ORANGE (R20)	STAINLESS STEEL	HINGED DOORS	BOTTOM	BETWEEN UNISURUT AND LV SUPPLY CABLE TERMINALS	300mm	FULL EARTH BAR
MAIN CIRCUIT BREAKER 2	HALF-RECESSED	IP44	FIBREGLASS	16mm	UPS SECTION - PURPLE (P09)	PERANAO	REMOVABLE PANELS	UNISURUT FOR K CLAMPS	BETWEEN AL CLAMP/PLATE AND TERMINALS	300mm	EARTH STUD
SUBSECTIONALISER	SURFACE MOUNTED	IP54	MILD STEEL	2mm	SEPARATED DIVISIONS	BRASS	REMOVABLE HOUSING	3mm min 3/16" SS GLAND PLATE	NUTS, BOLTS, CLAMPS, WASHERS ETC. MATERIAL	MAXIMUM DB SIZE	ADDITIONAL EARTH SPIKE
POWER FACTOR CONTROL	FLOOR STANDING	IP55	ELECTRO GALVANISED		NORMAL		LOCKING MECHANISM	CABLE EXIT			NEUTRAL BAR
LPS / BATTERIES	POLE MOUNTED	IP65	ETCH FRAME				REAR ACCESS				TINNED COPPER
DISTRIBUTION SECTIONS	CROSS-ARM MOUNTED	IP65	304 STAINLESS STEEL	BRUSHED			3 POINT SS				ALUMINIUM
	WALL MOUNTED	IP68	1916 STAINLESS STEEL	POWDER COATED			STD. PERANAO TYPE				INSULATED BUSBAR
							SQUARE KEY TYPE				NEUTRAL STUD



AC	ALTERNATING CURRENT
AL	ALUMINIUM
CCTV	CLOSED-CIRCUIT TELEVISION
DB	DISTRIBUTION BOARD
DC	DIRECT CURRENT
DP	DOUBLE POLE
ELU	EARTH LEAKAGE UNIT
HVAC	HEATING, VENTILATION AND AIR CONDITIONING
ICW	INSULATED COPPER EARTH WIRE
ICT	INFORMATION AND COMMUNICATION TECHNOLOGIES
KA	KILO AMPERE
kVA	KILO VOLT AMPERE
LED	LIGHT EMITTING DIODE
LPS	LIGHTNING PROTECTION SYSTEM
MCB	MINIATURE CIRCUIT BREAKER
MV	MEDIUM VOLTAGE
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
SP	SINGLE POLE
SS	STAINLESS STEEL
TBC	TO BE CONFIRMED
TP	TRIPPLE POLE
UPS	UNINTERRUPTIBLE POWER SUPPLY



DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

- NOTES**
- 1) DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - 2) THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - 3) ALL MINIMATURE CIRCUIT BREAKERS (MCB) TO BE SABS APPROVED. REFER TO DETAIL SPECIFICATION FOR FURTHER REQUIREMENTS.
  - 4) CONTRACTOR TO SUBMIT DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO THE COMMENCEMENT OF THE MANUFACTURING THEREOF.
  - 5) ALL CIRCUIT BREAKERS - ICB = ICS 100%.
  - 6) ALL SWITCHGEAR CO-ORDINATION - TYPE 2 (FULL CO-ORDINATION).
  - 7) ALL CONTRACTORS TO BE ACS, UNLESS OTHERWISE SPECIFIED.
  - 8) ALL MCBs TO BE CURVE C (STANDARD), UNLESS OTHERWISE SPECIFIED.
  - 9) THE IA RATING OF THE RESPECTIVE CIRCUIT BREAKERS TO MEET THE IA RATING OF THE BUSBAR FROM WHICH IT IS SUPPLIED.
  - 10) FINAL UPS SECTION BREAKER SIZES TO BE FINALISED, BASED ON FINAL UPS SYSTEM DESIGN & PRODUCT.
  - 11) FINAL SURGE ARRESTOR(S) SIZES TO BE DETERMINED ONCE THE EARTHING AND LIGHTNING PROTECTION SYSTEM DESIGNS HAVE BEEN FINALISED.
  - 12) ALL ISOLATORS TO BE OF THE SWITCH DISCONNECTOR TYPE.
  - 13) ALL CABLES AND CONDUCTORS WITHIN THE SUBSTATION SHALL BE OF THE UNARMOURD TYPE, UNLESS OTHERWISE SHOWN OR SPECIFIED.
  - 14) THIS CIRCUIT BREAKER IS FEEDING A MECHANICAL LOAD AND MUST HAVE TIME DELAY SETTING CAPABILITY.
  - 15) CONTRACTOR SHALL ALLOW 3% SPARE SPACE FOR POSSIBLE FUTURE ADDITIONS.

MASTER  
21 JUN 2018  
AECOM TRANSNET

**AECOM**  
CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CHRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION	DD	BS	BS	2018-06-20
00	ISSUED FOR CONSTRUCTION	DD	BS	BS	2018-03-19

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
00	ISSUED FOR CONSTRUCTION	DD	BS	BS	2018-03-19

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
-	-	-	-	DRAWN	DD	[Signature]	18 06 20
-	-	-	-	CHECKED	DC	[Signature]	18 06 20
-	-	-	-	DESIGNED	LK	[Signature]	18 06 20
-	-	-	-	CHECKED	BS	[Signature]	18 06 20
<b>OPERATING DIVISIONS</b>							
TITLE	NAME	SIGN	DATE				
-	-	-	-	PR-ENG. / PRL-TECH./PR-ARCH			
-	-	-	-	NAME: B. GIBSON			
-	-	-	-	SIGNATURE: [Signature]			
-	-	-	-	REG. NUMBER: 201720535			
-	-	-	-	SCALE: NTS			

Transnet Capital Projects

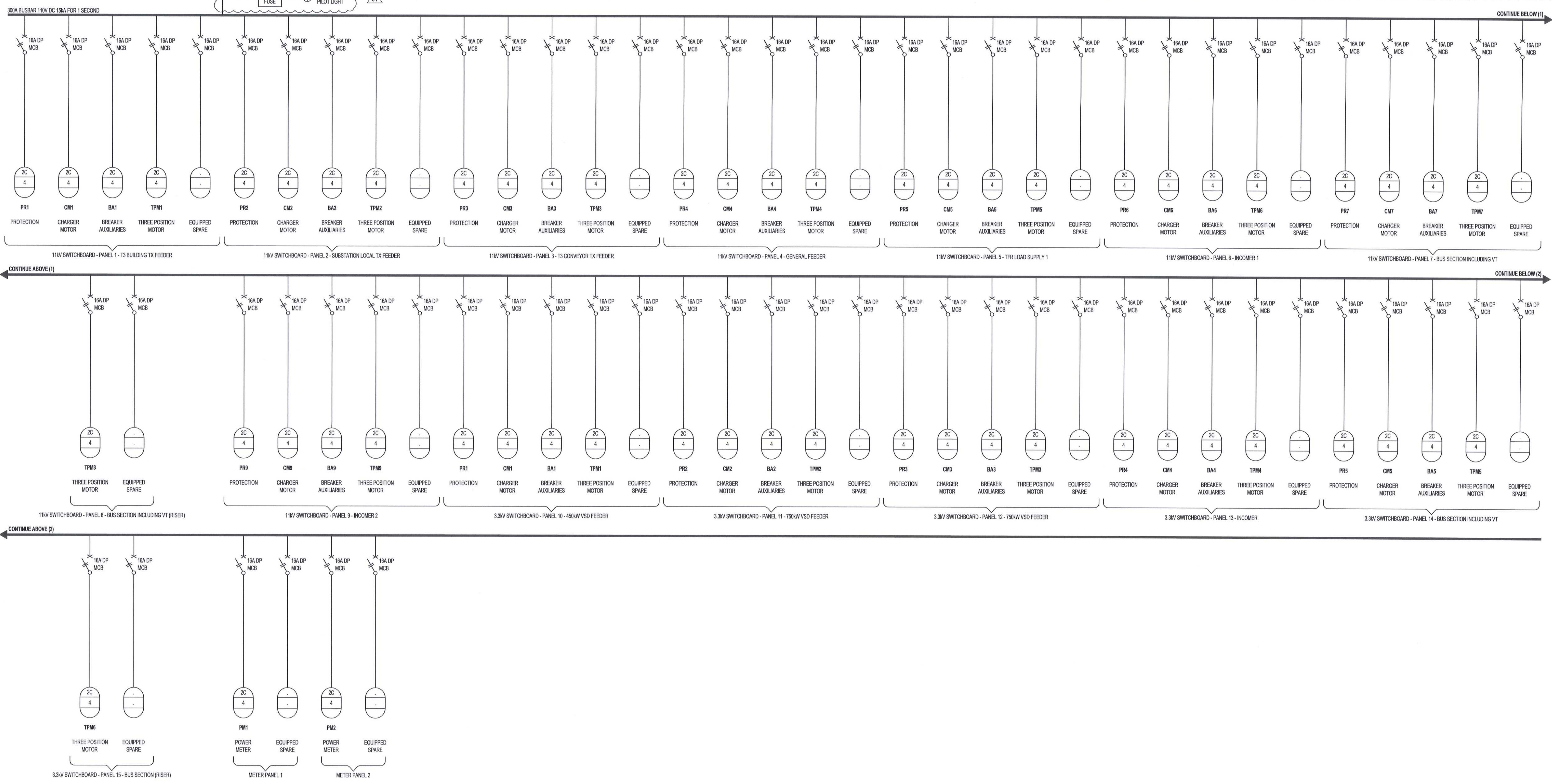
**PORT OF SALDANHA**  
IRON ORE TIPLER 3 PROJECT  
BULK POWER UPGRADE:  
SUBSTATION M  
SINGLE LINE DIAGRAM  
MAIN DISTRIBUTION BOARD (MDB)

PROJECT NUMBER: 000  
FIBS: 2  
DIS: 3  
TYPE: E  
DRAWING NO: 0010  
SHEET: 01  
REV: 01  
ID: AE

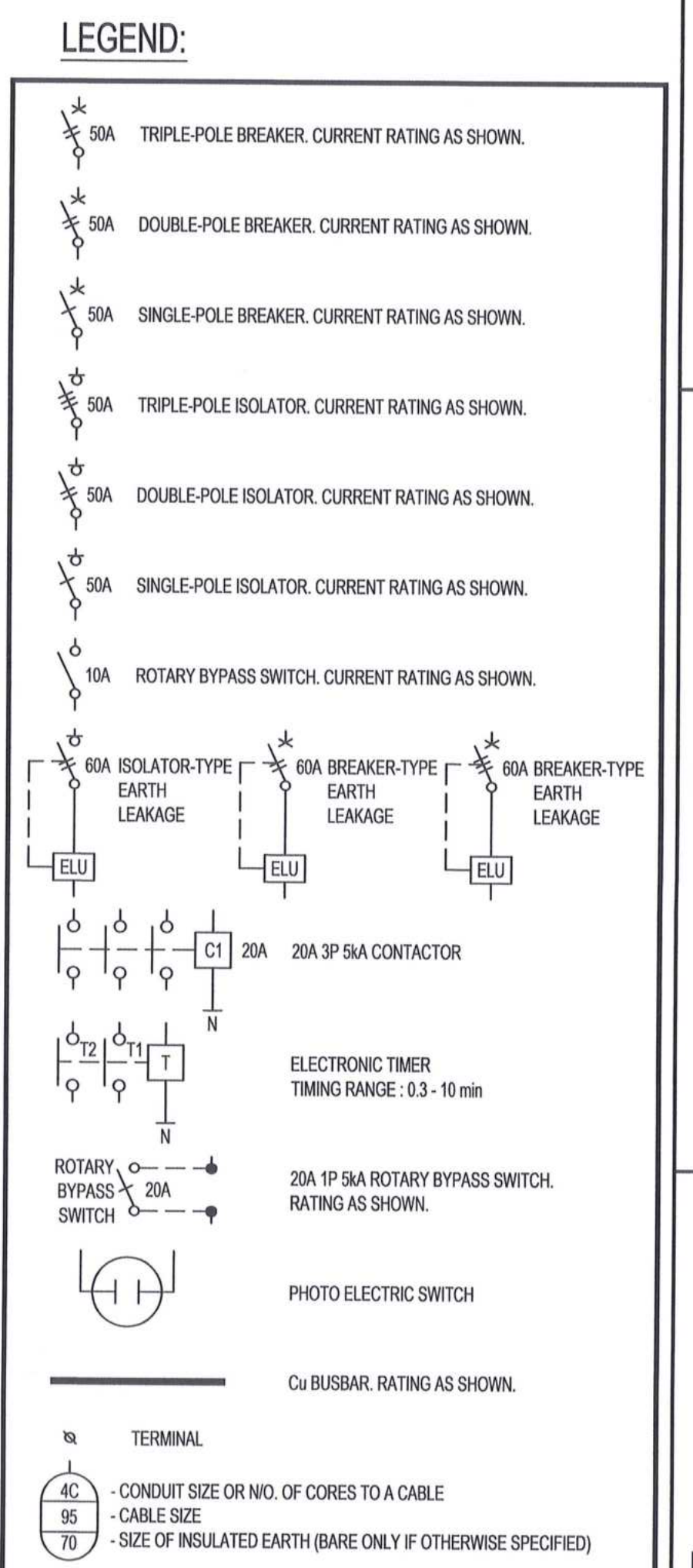
SDB-MVE (UPS)

110V DC SECTION  
16kVA (of 20kVA)

SANS 60439-1		CONSTRUCTION DETAILS AND ELECTRICAL SPECIFICATIONS FOR SDB-MVE											
REQUIREMENTS FOR THIS PANEL	DB MOUNTING	IP RATING	MATERIAL TYPE	MATERIAL THICKNESS	COLOR	HINGES	DOORS AND ACCESS	LV SUPPLY CABLE ENTRY	MIN DISTANCES FOR CABLE TERMINATIONS	EARTHING	BUSBARS		
MAIN DISTRIBUTION SECTION	FORM 4A	RECESSED	P35	POLYETHYLENE	1.2mm	MAIN ELECTRIC - ORANGE (R20)	STAINLESS STEEL	BOTTOM	300mm	FULL EARTH BAR	BUSBAR RATING IN AMPS	AS SHOWN	
CIRCUIT DISTRIBUTION SECTIONS	FORM 2B	HALF-RECESSED	P34	FIBREGLASS	1.8mm	FACE PLATE - PURPLE (P06)	PERANO	LINSTRUT FOR K CLAMPS	300mm	EARTH STUD	BUSBAR FAULT LEVEL	AS SHOWN	
		SURFACE MOUNTED	P34	MILD STEEL	2mm	SEPARATED DIVISIONS	BRASS	REMOVABLE HOUSING	300mm	ADDITIONAL EARTH SPIKE	COPPER	AS SHOWN	
		FLOOR STANDING	P35	ELECTRO GALVANISED			LOCKING MECHANISM	CABLE EXIT		NEUTRAL BAR	INSULATED		
		POLE MOUNTED	P35	ETCH PRIME			3 POINT SS	TOP		DEPTH	INSULATED		
		CROSS-ARM MOUNTED	P36	304 STAINLESS STEEL			STD. PERANO TYPE	UNISTRUT FOR K CLAMPS		WIDTH	INSULATED		
		WALL MOUNTED	P36	316 STAINLESS STEEL			SQUARE KEY TYPE	30mm MIN 316 SS GLAND PLATE		MAX INSTALLATION HEIGHT			

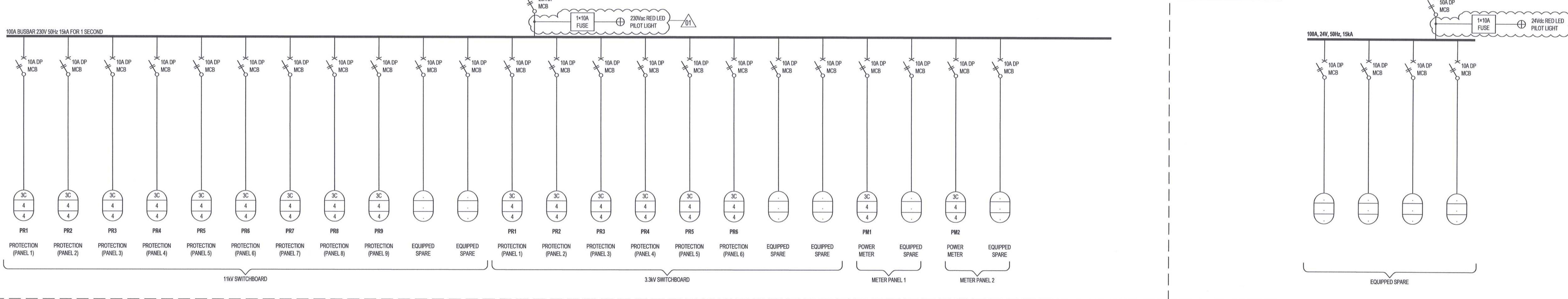


AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:  
 • MV SWITCHGEAR  
 • PROTECTION  
 • METERING



230V AC SECTION  
3kVA (of 20kVA)

24V DC SECTION  
1kVA (of 20kVA)



- NOTES
- DO NOT SCALE DRAWINGS - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - ALL MINATURE CIRCUIT BREAKERS (MCBs) TO BE SABS APPROVED. REFER TO DETAIL SPECIFICATION FOR FURTHER REQUIREMENTS.
  - CONTRACTOR TO SUBMIT DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO THE COMMENCEMENT OF THE MANUFACTURING THEREOF.
  - ALL CIRCUIT BREAKERS: Icu = Ics 100%.
  - ALL SWITCHGEAR CO-ORDINATION - TYPE 2 (FULL CO-ORDINATION).
  - ALL CONTACTORS TO BE ACS, UNLESS OTHERWISE SPECIFIED.
  - ALL MCBs TO BE CURVE C (STANDARD), UNLESS OTHERWISE SPECIFIED.
  - THE IA RATING OF THE RESPECTIVE CIRCUIT BREAKERS TO MEET THE IA RATING OF THE BUSBAR FROM WHICH IT IS SUPPLIED.
  - FINAL UPS SECTION BREAKER SIZES TO BE FINALISED, BASED ON FINAL UPS SYSTEM DESIGN & PRODUCT.
  - FINAL SURGE ARRESTORS SIZES TO BE DETERMINED ONCE THE EARTHING AND LIGHTNING PROTECTION SYSTEM DESIGNS HAVE BEEN FINALISED.
  - ALL ISOLATORS TO BE OF THE SWITCH/DISCONNECTOR TYPE.
  - ALL CABLES AND CONDUCTORS WITHIN THE SUBSTATION SHALL BE OF THE UNARMoured TYPE, UNLESS OTHERWISE SHOWN OR SPECIFIED.
  - CONTRACTOR SHALL ALLOW 3% SPARE SPACE FOR POSSIBLE FUTURE ADDITIONS.

MASTER  
21 JUN 2018  
AECOM TRANSNET

AECOM  
CAPE TOWN OFFICE  
WATERBURY PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 956 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1966/006628/07

ISSUED FOR CONSTRUCTION:

- HOLD POINT ADDED
- ABBREVIATION/LEGEND - ACRONYM 'LED' ADDED
- FUSES ADDED
- LED PILOT LIGHTS ADDED

ISSUED FOR CONSTRUCTION

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01		DD	BS	BS	2018-06-20
02		DD	BS	BS	2018-03-19

REVISIONS

CONTRACTOR / CONSULTANT				TRANSNET CAPITAL PROJECTS			
TITLE	NAME	SIGN	DATE	TITLE	NAME	SIGN	DATE
				DRAWN	DD		18 06 20
				CHECKED	DC		18 06 20
				DESIGNED	LK		18 06 20
				CHECKED	BS		18 06 20

OPERATING DIVISIONS

TITLE	NAME	SIGN	DATE

PR.ENG. / PR.TECH./PR. ARCH

NAME	DATE
B SANSOM	

SIGNATURE

REG. NUMBER: 28525005

SCALE: NTS

Transnet Capital Projects

TRANSNET

TRANSNET CAPITAL PROJECTS

TABLE BAY BUILDING, TYGERBERG PARK,  
160 UPV ROAD, DRINKWATER, TYGERBERG,  
7801

TEL: 021 950 9509  
FAX: 021 957 2605

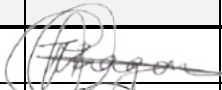

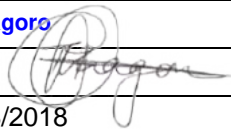
PORT OF SALDANHA  
IRON ORE TIPLER 3 PROJECT  
BULK POWER UPGRADE:  
SUBSTATION M  
SINGLE LINE DIAGRAM  
MV EQUIPMENT SUB DISTRIBUTION BOARD (SDB-MVE)

PROJECT NUMBER: 001 FBS BBS TYPE: DRAWING NO: SHEET: REV: ID

1 | 9 | 2 | 4 | 7 | 0 | 1 | 2 | 3 | 0 | 0 | E | S | L | 0 | 0 | 1 | 0 | 1 | 1 | A | E



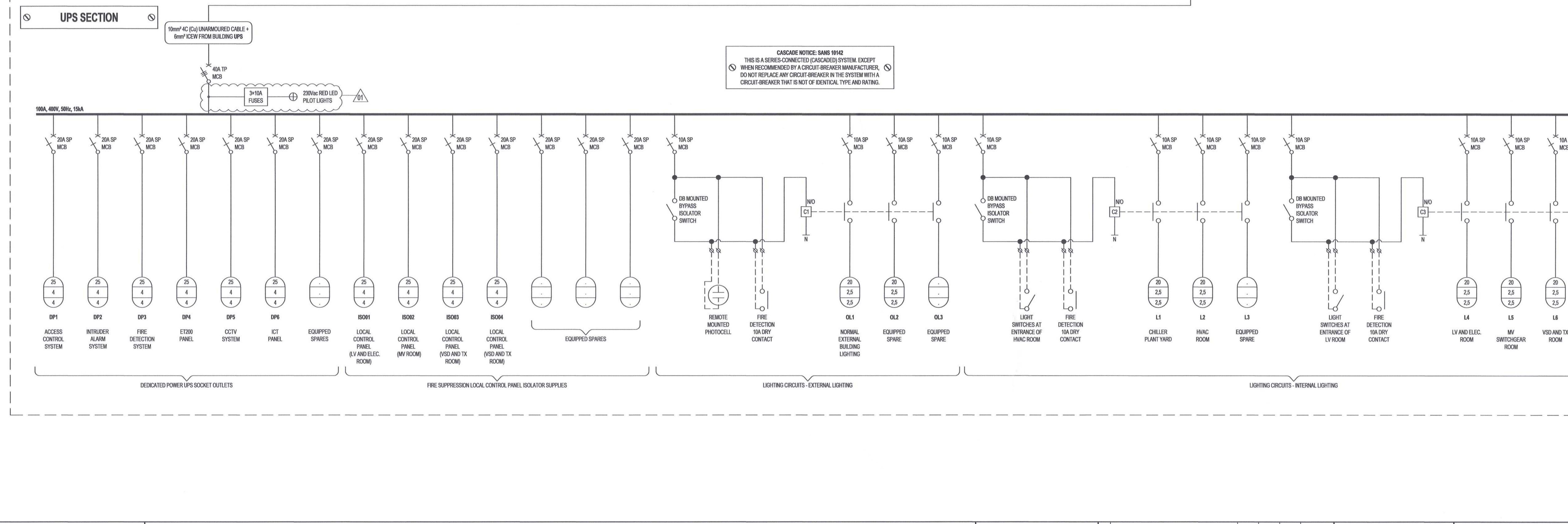
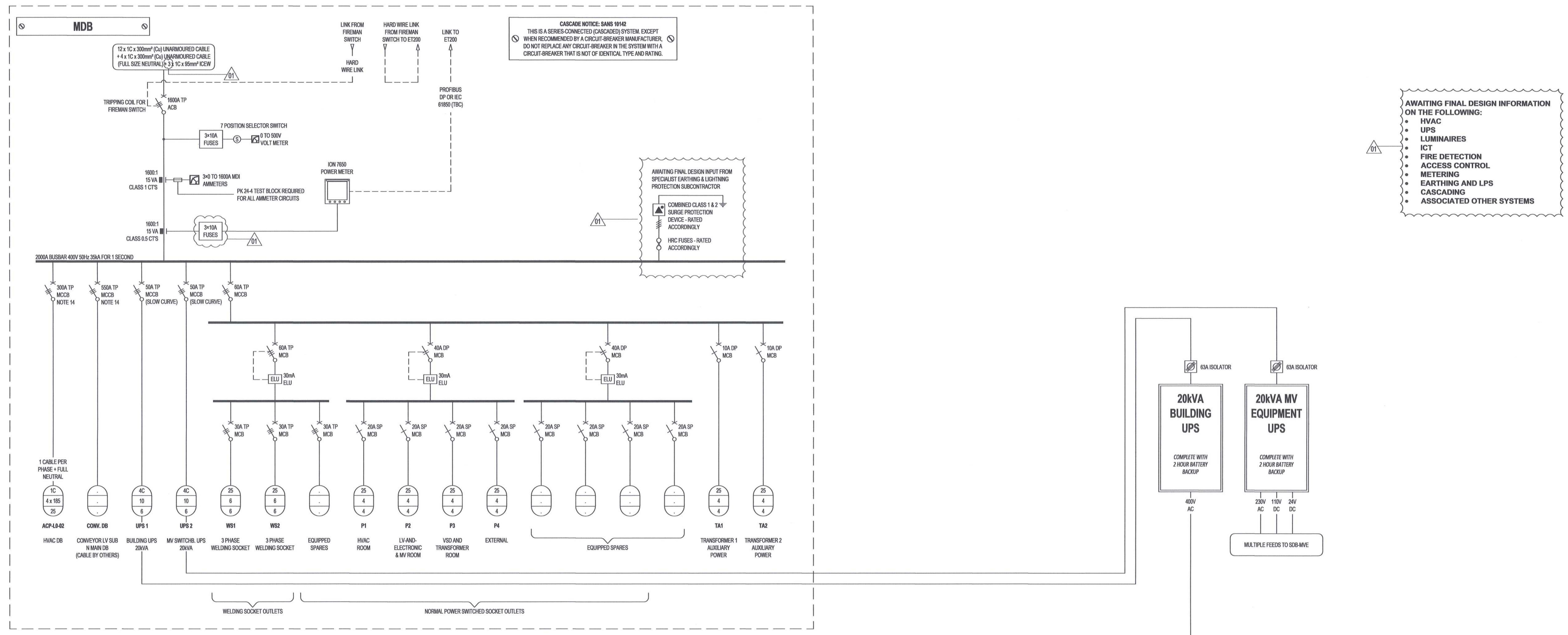
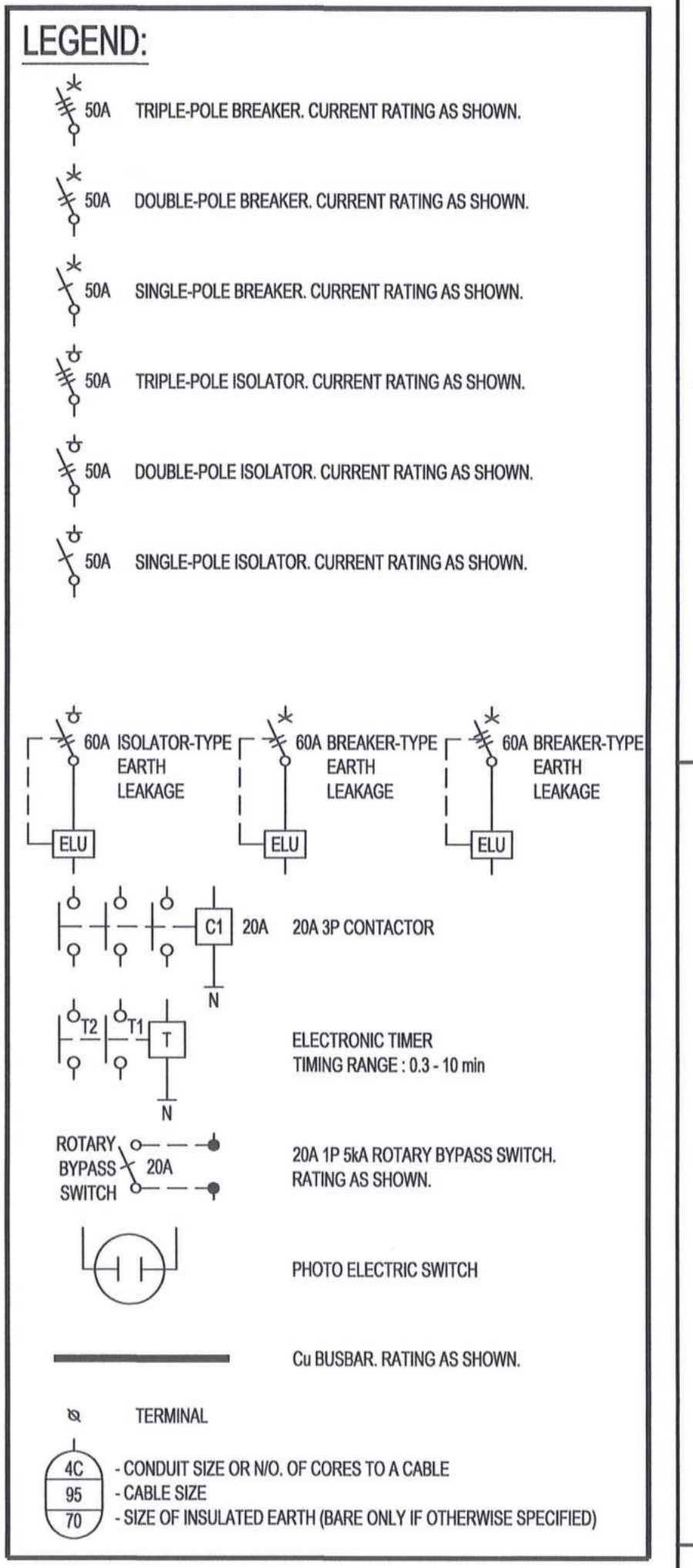
**SQUAD CHECK FORM**

Location		<b>Saldanha</b>		Squad Check Number		<b>1924701.E004-SQ-0035</b>			
Title		<b>Substation N: Single Line Diagram: Main Distribution Board (MDB)</b>		Contract No.		<b>E004</b>			
Project Name		<b>Installation of the 3rd Tippler at the Port of Saldanha</b>		Project No.		<b>1924701</b>			
Document No.		<b>1924701-2-300-E-SL-0011-01-01</b>		Revision		<b>01</b>			
Discipline	Reviewer's Name	Reviewer's Signature	Date	Mandatory	Optional	Accepted	Accepted with Comments	Rejected	Information
	Thulane Magoro		30/08/2018				X		
	Bonga Ntshangase		30/08/2018				X		
	TNPA						X		
<i>REVIEW STATUS (Assigned by Responsible Project Manager)</i>									
C 1	<input type="checkbox"/>	ACCEPTED		C 3	<input type="checkbox"/>	REJECTED			
C 2	<input checked="" type="checkbox"/>	ACCEPTED WITH COMMENTS (REVISE & SUBMIT)		C 4	<input type="checkbox"/>	INFORMATION			
<b>SIGNED BY:</b>  <b>RESPONSIBLE PROJECT MANAGER</b>				Print Name	<b>TR Magoro</b>				
				Signature	PP 				
				Date	30/08/2018				
<i>This review is only for general conformance with the design concept of the Project and general compliance with the information given in the contract documents</i>									





SANS 60439-1													
REQUIREMENTS FOR THIS PANEL	DB MOUNTING	IP RATING	MATERIAL TYPE	MATERIAL THICKNESS	COLOUR	HINGES	DOORS AND ACCESS	LV SUPPLY CABLE ENTRY	MIN DISTANCES FOR CABLE TERMINATIONS	EARTHING	BUSBARS		
MAIN CIRCUIT BREAKER 1	RECESSED	IP35	POLYETHYLENE	1.2mm	MAIN SECTION - ELECTRIC ORANGE (BSI)	STAINLESS STEEL	HINGED DOORS	BOTTOM	BETWEEN UNSTRUT AND LV SUPPLY CABLE TERMINALS	300mm	FULL EARTH BAR	BUSBAR RATING IN AMPS	AS SHOWN
MAIN CIRCUIT BREAKER 2	HALF-RECESSED	IP44	FIBREGLASS	1.6mm	UPS SECTION - PURPLE (BSI)	PENANO	REMOVABLE PANELS	UNSTRUT FORK CLAMPS	BETWEEN N.G. CLAND PLATE AND TERMINALS	200mm	EARTH STUD	BUSBAR FAULT LEVEL	AS SHOWN
BUS SECTION/USER	SURFACE MOUNTED	IP54	MILD STEEL	2mm	SEPARATED DIVISIONS	BRASS	REMOVABLE HOUSING	3mm MIN. 3/16" SS GLAND PLATE	WASHERS, BOLTS, CLAMPS	MAXIMUM DB SIZE	ADDITIONAL EARTH SPIKE	COPPER	
POWER/FUNCTION CONTROL	FLOOR STANDING	IP55	ELECTRO GALVANISED		MATERIAL FINISH	NORMAL	LOCKING MECHANISM	CABLE EXIT	WASHERS ETC. MATERIAL	HEIGHT	NEUTRAL BAR	TINNED COPPER	
UPS / BATTERIES	POLE MOUNTED	IP55	ETCH PRIME				3 POINT SS	UNSTRUT FORK CLAMPS	MILD STEEL	DEPTH	FULL NEUTRAL BAR	ALUMINIUM	
DISTRIBUTION SECTIONS	CROSS-ARM MOUNTED	IP55	304 STAINLESS STEEL	BRUSHED			STD. PERMANO TYPE	UNSTRUT FORK CLAMPS	BRASS	WIDTH	HALF NEUTRAL BAR	INSULATED BUSBAR	
	WALL MOUNTED	IP58	1/16" STAINLESS STEEL	POWDER COATED			SQUARE KEY TYPE	3mm MIN. 3/16" SS GLAND PLATE	3/16" STAINLESS STEEL	MIN. INSTALLATION HEIGHT	NEUTRAL STUD		



NOTES	
1) DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.	7) ALL CONTACTORS TO BE ACL, UNLESS OTHERWISE SPECIFIED.
2) THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.	8) ALL MCBs TO BE CURVE C (STANDARD), UNLESS OTHERWISE SPECIFIED.
3) ALL MINIMATURE CIRCUIT BREAKERS (MCB) TO BE SABS APPROVED. REFER TO DETAIL SPECIFICATION FOR FURTHER REQUIREMENTS.	9) THE IA RATING OF THE RESPECTIVE CIRCUIT BREAKERS TO MEET THE IA RATING OF THE BUSBAR FROM WHICH IT IS SUPPLIED.
4) CONTRACTOR TO SUBMIT DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO THE COMMENCEMENT OF THE MANUFACTURING THEREOF.	10) FINAL UPS SECTION BREAKER SIZES TO BE FINALISED, BASED ON FINAL UPS SYSTEM DESIGN & PRODUCE.
5) ALL CIRCUIT BREAKERS - ICB = KS 100%.	11) FINAL SURGE ARRESTORS (SIZES) TO BE DETERMINED ONCE THE EARTHING AND LIGHTNING PROTECTION SYSTEM DESIGNS HAVE BEEN FINALISED.
6) ALL SWITCHGEAR CO-ORDINATION = TYPE 2 (FULL CO-ORDINATION).	12) ALL ISOLATORS TO BE OF THE SWITCH-DISCONNECTOR TYPE.
13) ALL CABLES AND CONDUCTORS WITHIN THE SUBSTATION SHALL BE OF THE UNARMOURD TYPE, UNLESS OTHERWISE SHOWN OR SPECIFIED.	
14) THIS CIRCUIT BREAKER IS FEEDING A MECHANICAL LOAD AND MUST HAVE TIME DELAY SETTING CAPABILITY.	
15) CONTRACTOR SHALL ALLOW 30% SPARE SPACE FOR POSSIBLE FUTURE ADDITIONS.	



**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1966/006628/07

ISSUED FOR CONSTRUCTION:	
• HOLD POINTS ADDED	
• ABBREVIATION/LEGEND - ACRONYM ICT, CCTV, UPS AND LED ADDED	
• CABLE QUANTITY FROM 2 x 1C 10mm <sup>2</sup> ICEW TO 3 x 1C 10mm <sup>2</sup> ICEW	
• FUSES ADDED	
• LED PILOT LIGHTS ADDED	

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01		DD	BS	BS	2018-06-20
00	ISSUED FOR CONSTRUCTION	DD	BS	BS	2018-03-19

REVISIONS	
NO.	DESCRIPTION
00	ISSUED FOR CONSTRUCTION

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	SIGN	DATE
DRAWN	DD	BS	18 06 20
CHECKED	DD	BS	18 06 20
DESIGNED	LK	BS	18 06 20
CHECKED	BS	BS	18 06 20

OPERATING DIVISIONS	
TITLE	NAME
PR. ENG. / PR. TECH./PR. ARCH	DATE
SIGNATURE	DATE
REG. NUMBER	201720035
SCALE	NTS

Transnet Capital Projects

**TRANSNET**

TRANSNET LTD (INCORPORATED AS TRANSNET CAPITAL PROJECTS) REG. NO. 1999/00000000  
TABLE BAY BUILDING, TYGERBERG PARK, TEL: 021 940 1999  
163 LIPS LARGE DRIVE, PLATTENBERG, FAX: 021 940 3455  
8001

**PORT OF SALDANHA**

IRON ORE TIPLER 3 PROJECT  
BULK POWER UPGRADE:  
SUBSTATION N  
SINGLE LINE DIAGRAM  
MAIN DISTRIBUTION BOARD (MDB)

PROJECT NUMBER	DB	FBS	DIS	TYPE	DRAWING NO.	SHEET	REV	ID
19	2	4	7	0	1	2	3	0
1	2	3	0	1	1	1	0	1

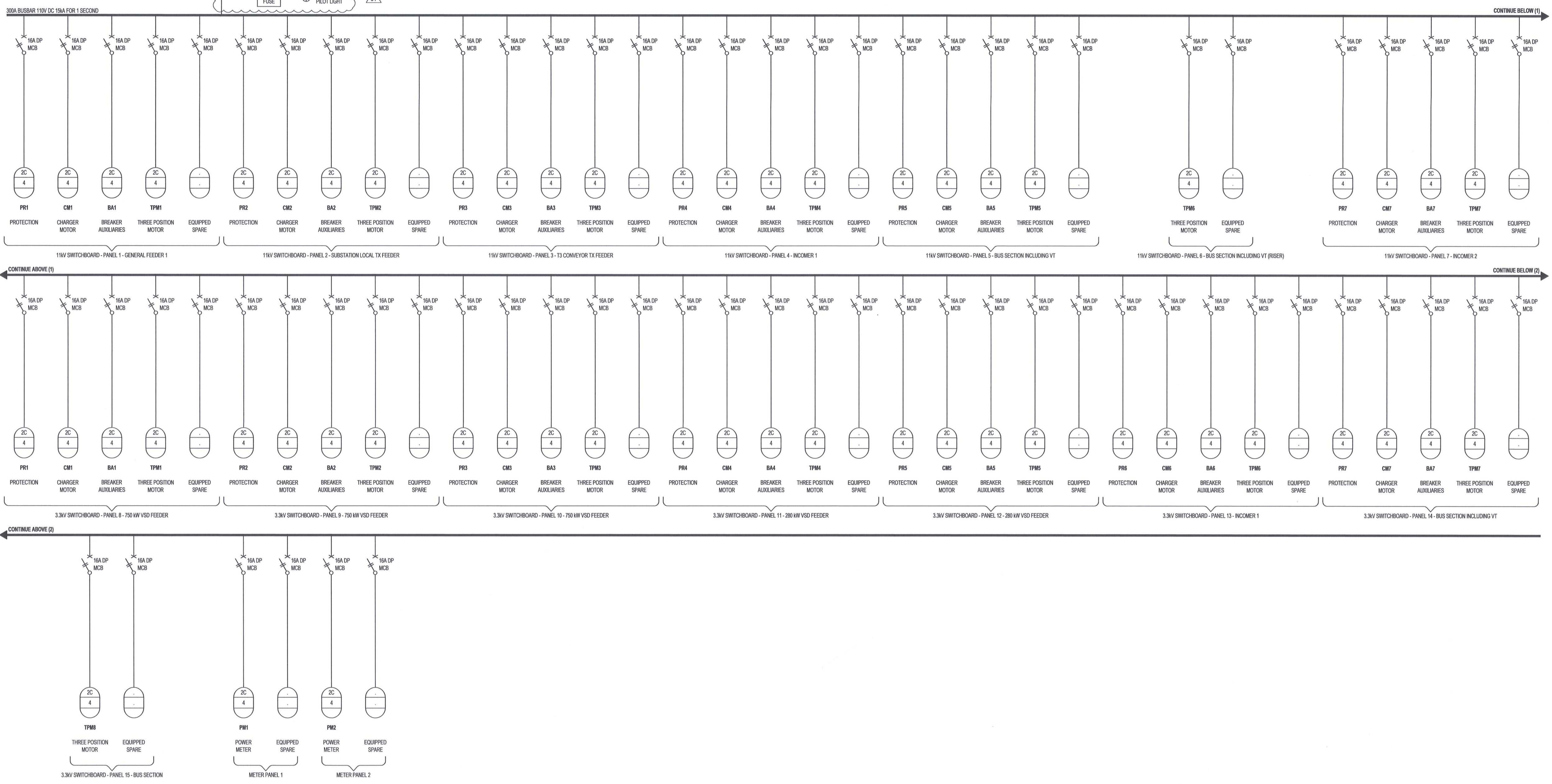
SDB-MVE (UPS)

110V DC SECTION  
16kVA (of 20kVA)

SANS 60439-1

REQUIREMENTS FOR THIS PANEL		DB MOUNTING	IP RATING	MATERIAL TYPE	MATERIAL THICKNESS	COLOUR	HINGES	DOORS AND ACCESS	LV SUPPLY CABLE ENTRY	MIN DISTANCES FOR CABLE TERMINATIONS	EARTHING	BUSBARS	
MAIN DISTRIBUTION SECTION	FORM 4A	RECESSED	IP35	POLYETHYLENE	1.2mm	MAIN ELECTRIC - ORANGE (E8)	STAINLESS STEEL	HINGED DOORS	ROTOP	BETWEEN UNISTRUT AND LV SUPPLY CABLE TERMINALS	300mm	FULL EARTH BAR	BUSBAR RATING IN AMPS
		HALF-RECESSED	IP44	FIBREGLASS	1.6mm	FACE PLATE - PURPLE (P6)	PERANO	REMOVABLE PANELS	UNISTRUT FOR K CLAMPS	BETWEEN A GRAND PLY AND TERMINALS	300mm	EARTH STUD	BUSBAR FAULT LEVEL
		SURFACE MOUNTED	IP54	MILD STEEL	2mm	BRASS	SEPARATED DIVISIONS	REMOVABLE HINGING	3mm MIN. 3/16" SS GLAND PLATE	MATERIAL CLAMPS	MAXIMUM DB SIZE	ADDITIONAL EARTH SPOKE	COPPER
		FLOOR STANDING	IP55	ELECTRO GALVANISED	3mm	NORMAL	MATERIAL FINISH	LOCKING MECHANISM	3mm MIN. 3/16" SS GLAND PLATE	WASHERS ETC. MATERIAL	HEIGHT	NEUTRAL BAR	TINNED COPPER
CIRCUIT DISTRIBUTION SECTIONS	FORM 2B	POLE MOUNTED	IP65	3CR12	ETCH PRIME	MAN + BUSBAR	3 POINT SS	REAR ACCESS	TOP	DEPTH	REFER TO SPECIFICATION	FULL NEUTRAL BAR	ALUMINIUM
		CROSS ARM MOUNTED	IP66	316 STAINLESS STEEL	BRUSHED	UPS	STD. PERANO TYPE	DOOR HOLD BACKS	UNISTRUT FOR K CLAMPS	WIDTH	DEPTH	HALF NEUTRAL BAR	INSULATED BUSBAR
		WALL MOUNTED	IP68	316 STAINLESS STEEL	POWDER COATED	SMALL POWER	SQUARE KEY TYPE	DOOR EARTH STRAP	3mm MIN. 3/16" SS GLAND PLATE	BRASS	MAX INSTALLATION HEIGHT	NEUTRAL STD	

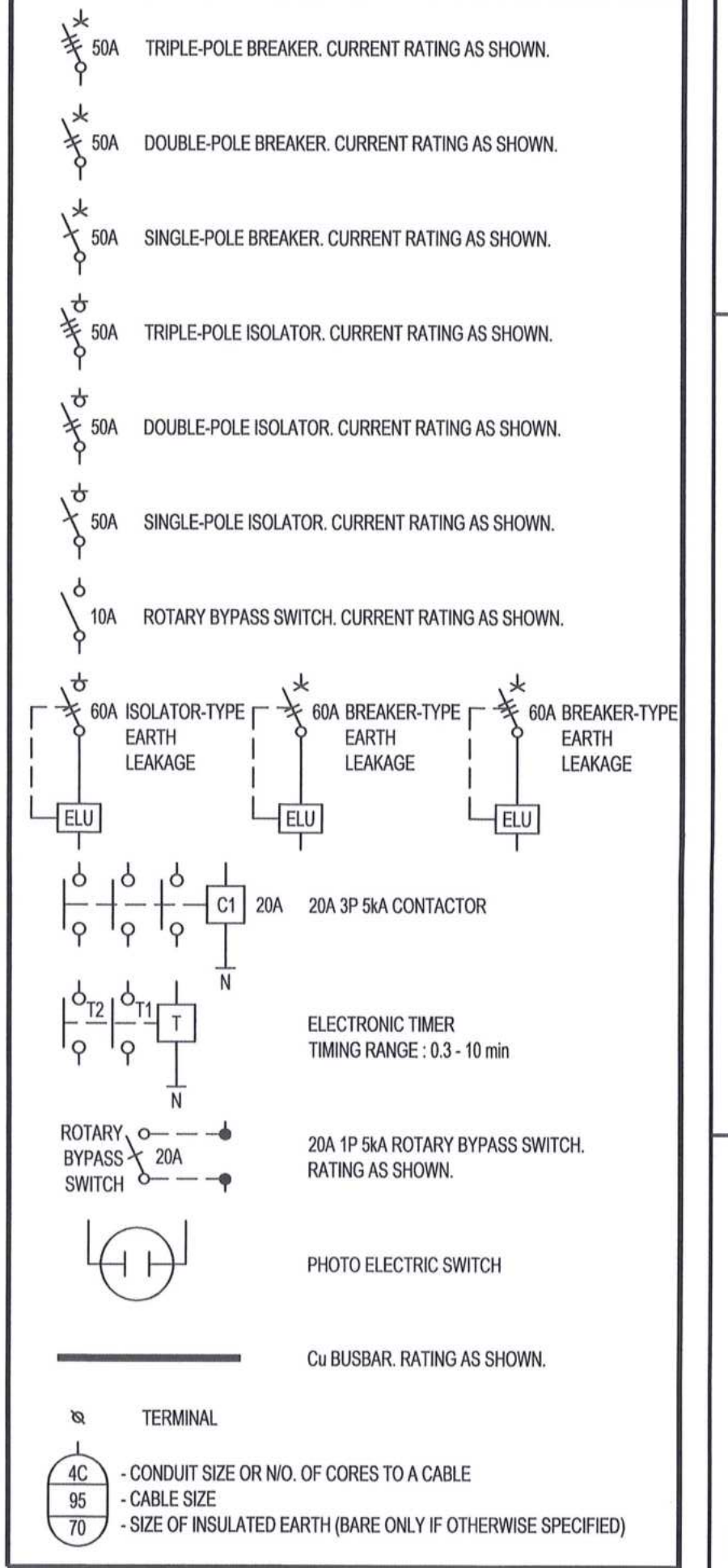
CONSTRUCTION DETAILS AND ELECTRICAL SPECIFICATIONS FOR SDB-MVE



AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:

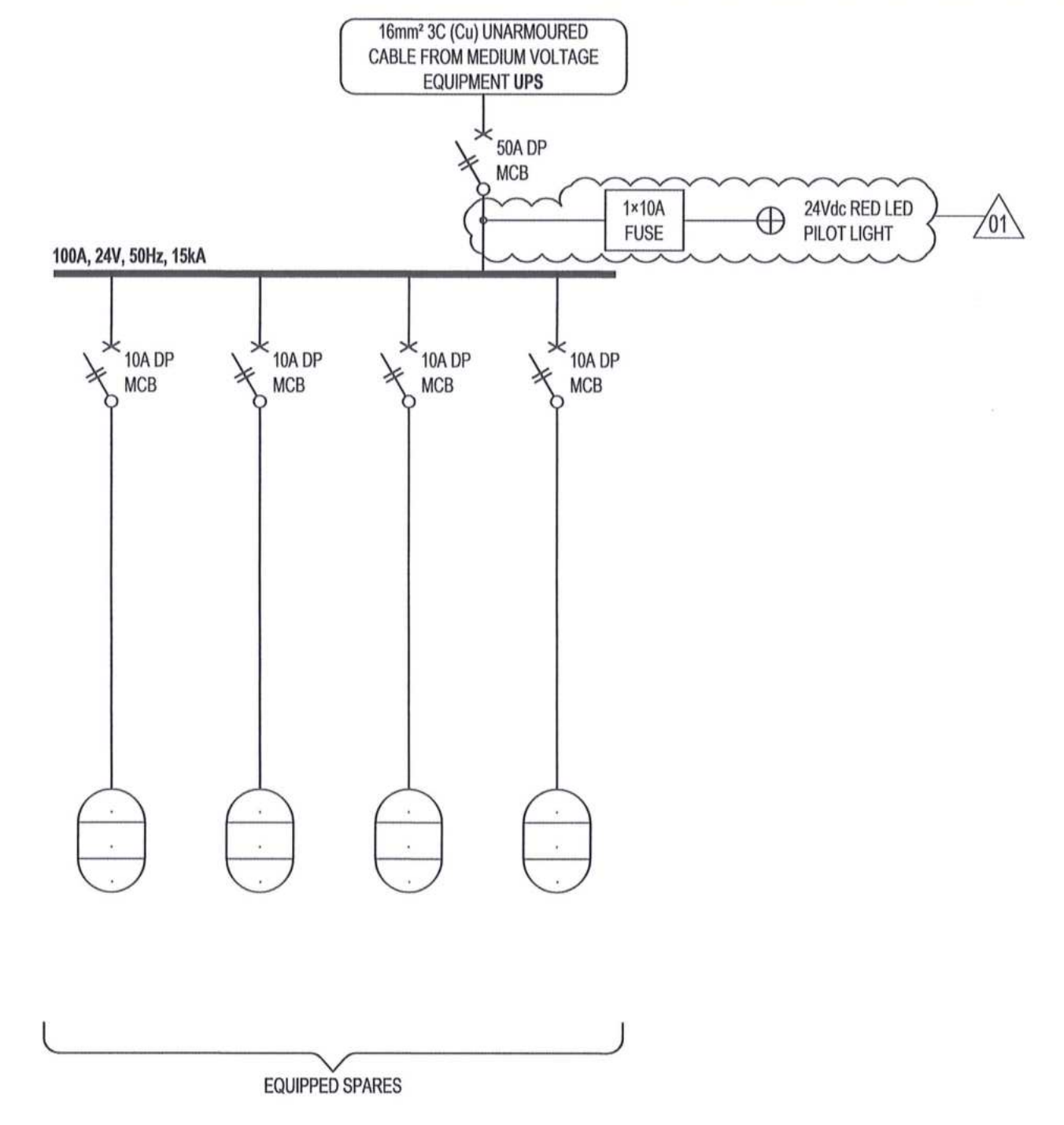
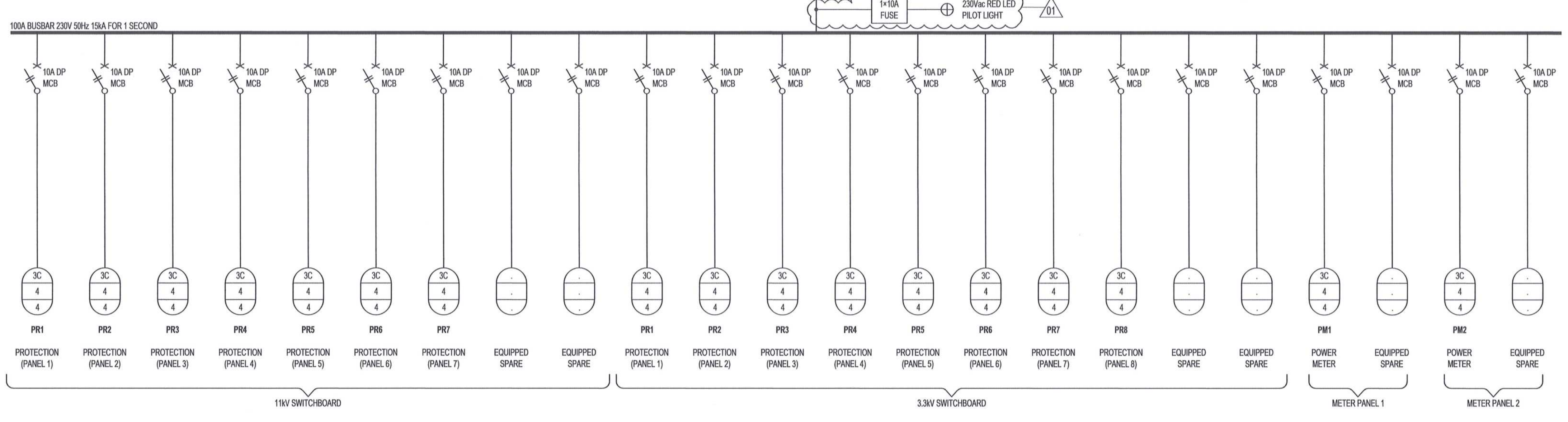
- MV SWITCHGEAR
- PROTECTION
- METERING

LEGEND:



230V AC SECTION  
3kVA (of 20kVA)

24V DC SECTION  
1kVA (of 20kVA)



- NOTES
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - ALL MINATURE CIRCUIT BREAKERS (MCBs) TO BE SABS APPROVED. REFER TO DETAIL SPECIFICATION FOR FURTHER REQUIREMENTS.
  - CONTRACTOR TO SUBMIT DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO THE COMMENCEMENT OF THE MANUFACTURING THEREOF.
  - ALL CIRCUIT BREAKERS: Icu = Ics 100%.
  - ALL SWITCHGEAR CO-ORDINATION - TYPE 2 (FULL CO-ORDINATION).
  - ALL CONTACTORS TO BE ACS, UNLESS OTHERWISE SPECIFIED.
  - ALL MCBs TO BE CURVE C (STANDARD), UNLESS OTHERWISE SPECIFIED.
  - THE IA RATING OF THE RESPECTIVE CIRCUIT BREAKERS TO MEET THE IA RATING OF THE BUSBAR FROM WHICH IT IS SUPPLIED.
  - FINAL UPS SECTION BREAKER SIZES TO BE FINALISED, BASED ON FINAL UPS SYSTEM DESIGN & PRODUCT.
  - FINAL SURGE ARRESTORS(S) SIZES TO BE DETERMINED ONCE THE EARTHING AND LIGHTNING PROTECTION SYSTEM DESIGN HAS BEEN FINALISED.
  - ALL ISOLATORS TO BE OF THE SWITCH-DISCONNECTOR TYPE.
  - ALL CABLING AND CONDUCTORS WITHIN THE SUBSTATION SHALL BE OF THE UNARMOURD TYPE, UNLESS OTHERWISE SHOWN OR SPECIFIED.
  - CONTRACTOR SHALL ALLOW 30% SPARE SPACE FOR POSSIBLE FUTURE ADDITIONS.



**AECOM**  
CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. No. 1966/006628/07

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION • HOLD POINT ADDED • ABBREVIATION LEGEND - ACRONYM 'LED' ADDED • FUSES ADDED • LED PILOT LIGHTS ADDED	DD	BS	BS	2018-06-20
02	ISSUED FOR CONSTRUCTION	DD	BS	BS	2018-03-19

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	SKN	DATE
DRAWING	DD	BS	18 06 20
CHECKED	DC	BS	18 06 20
DESIGNED	LK	BS	18 06 20
CHECKED	BS	BS	18 06 20

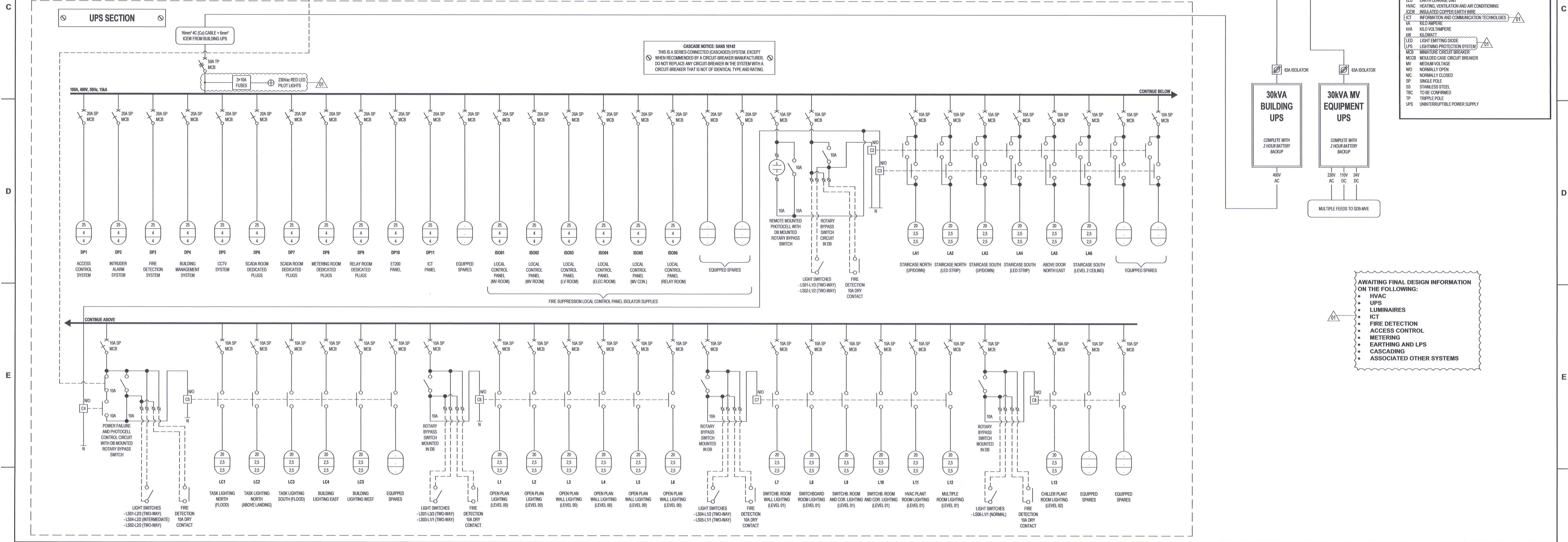
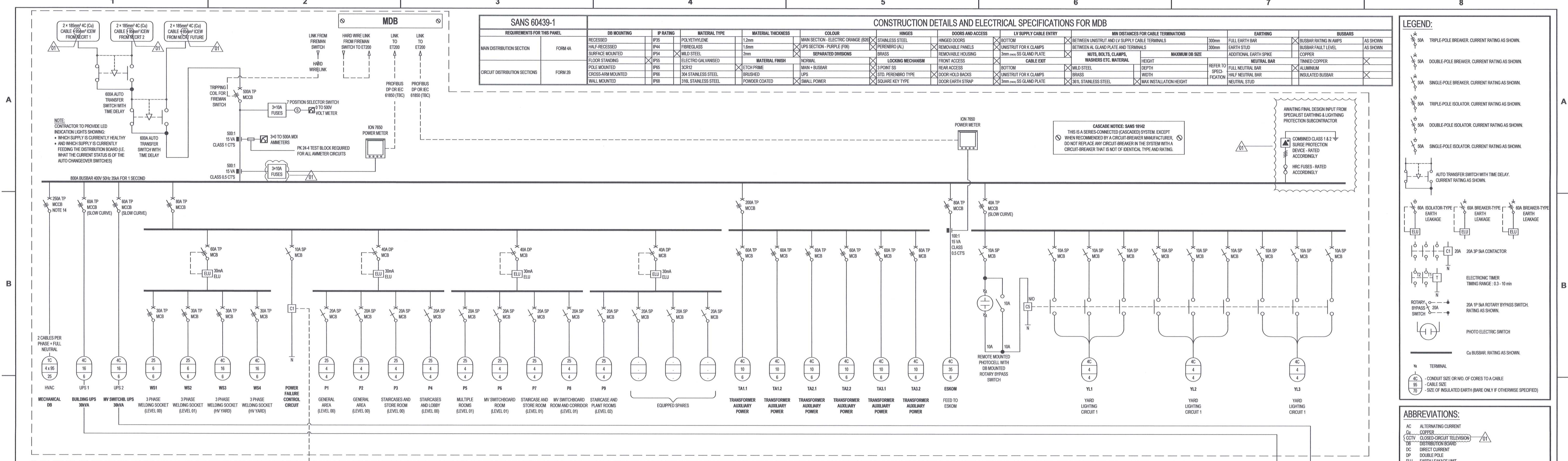
Transnet Capital Projects

**TRANSNET**

TRANSNET LTD (PROMOTED BY TRANSNET CAPITAL PROJECTS) REG. NO. 200500000000  
TABLE BAY BUILDINGS, TYDERSBURG PARK, 163 LYS KROUSE DRIVE, PLATTENBERG, 7601  
TEL: 021 940 1999  
FAX: 021 940 2455

**PORT OF SALDANHA**  
IRON ORE TIPPLER 3 PROJECT  
BULK POWER UPGRADE:  
SUBSTATION N  
SINGLE LINE DIAGRAM  
MVE EQUIPMENT SUB DISTRIBUTION BOARD (SDB-MVE)

PROJECT NUMBER: 191247011-2300E|S|L|0|0|1|2|0|1|0|1|AE



DRAWING NO.	REFERENCE

**NOTES**

- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE MEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
- ALL MINIATURE CIRCUIT BREAKERS (MCB) TO BE SANS APPROVED. REFER TO DETAIL SPECIFICATION FOR FURTHER REQUIREMENTS.
- CONTRACTOR TO SUBMIT DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO THE COMMENCEMENT OF THE MANUFACTURING THEREOF.
- ALL CIRCUIT BREAKERS: ICB + CS 100%.
- ALL SWITCHGEAR CO-ORDINATION + TYPE 2 (FULL CO-ORDINATION).

- ALL CONTACTORS TO BE A.C.L. UNLESS OTHERWISE SPECIFIED.
- ALL MCCBs TO BE CURVE C (STANDARD), UNLESS OTHERWISE SPECIFIED.
- THE IA RATING OF THE RESPECTIVE CIRCUIT BREAKERS TO MEET THE IA RATING OF THE BUSBAR FROM WHICH IT IS SUPPLIED.
- FINAL UPS SECTION BREAKER SIZES TO BE FINALISED, BASED ON FINAL UPS SYSTEM DESIGN & PRODUCT.
- FINAL SURGE ARRESTOR(S) SIZES TO BE DETERMINED ONCE THE EARTHING AND LIGHTNING PROTECTION SYSTEM DESIGN HAS BEEN FINALISED.
- ALL ISOLATORS TO BE OF THE SWITCH-DISCONNECTOR TYPE.

- ALL CABLEING AND CONDUCTORS WITHIN THE SUBSTATION SHALL BE OF THE UNARMED TYPE, UNLESS OTHERWISE SHOWN OR SPECIFIED.
- THIS CIRCUIT BREAKER IS FEEDING A MECHANICAL LOAD AND MUST HAVE TIME DELAY SETTING CAPABILITY.
- CONTRACTOR SHALL ALLOW 30% SPARE SPACE FOR POSSIBLE FUTURE ADDITIONS.

**MASTER**

**21 JUN 2018**

**AECOM**     **TRANSNET**

**AECOM**

CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGERWATERFONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7002  
REG. No. 1966/006628/07

**CONTRACTOR / CONSULTANT**

TITLE	NAME	SIGN	DATE
ISSUED FOR CONSTRUCTION			2018-06-20
ISSUED FOR CONSTRUCTION			2018-06-20

**REVISIONS**

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION				2018-06-20
02	ISSUED FOR CONSTRUCTION				2018-06-20

**TRANSNET CAPITAL PROJECTS**

TITLE	NAME	SIGN	DATE
ISSUED FOR CONSTRUCTION			2018-06-20
ISSUED FOR CONSTRUCTION			2018-06-20

**OPERATING DIVISIONS**

TITLE	NAME	SIGN	DATE
PRENG. / PR TECH. / PR. ARCH			

**SCALE:** NTS

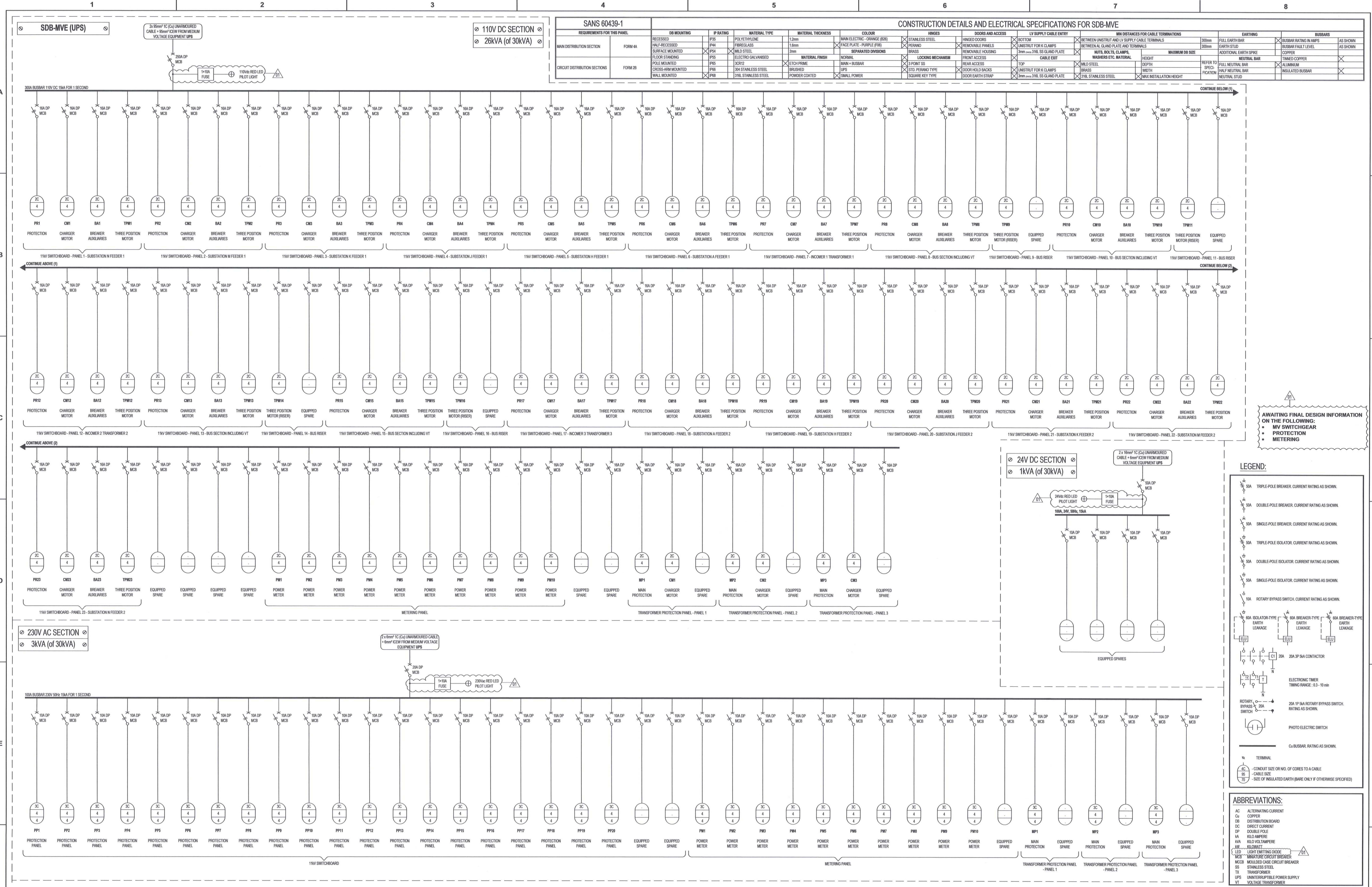
TRANSNET Capital Projects

TRANSNET LTD (CRANED AS TRANSNET CAPITAL PROJECTS) REG. NO. 19998000000  
TABLE BAY BUILDING, TYGERBERG PARK,  
160 LYPHE WINDIE DRIVE, PLATTEKLOOF,     TEL: 021 945 1999  
8001     FAX: 006 677 2455

**PORT OF SALDANHA**  
IRON ORE TIPLER 3 PROJECT  
BULK POWER UPGRADE:  
NEW MAIN INTAKE SUBSTATION  
MAIN DISTRIBUTION BOARD (MDB)  
SINGLE LINE DIAGRAM

PROJECT NUMBER: 0517265025  
SCALE: NTS

PROJECT NUMBER: 0517265025  
SCALE: NTS



SANS 60439-1													
REQUIREMENTS FOR THIS PANEL		DB MOUNTING	IP RATING	MATERIAL TYPE	MATERIAL THICKNESS	COLOUR	HINGES	DOORS AND ACCESS	LV SUPPLY CABLE ENTRY	MIN DISTANCES FOR CABLE TERMINATIONS	EARTHING	BUSBARS	
MAIN DISTRIBUTION SECTION	FORM 1A	RECESSED	IP35	POLYETHYLENE	1.2mm	MAIN ELECTRIC - ORANGE (R2)	STAINLESS STEEL	HINGED DOORS	UNISTRUT FOR CABLES	BETWEEN UNISTRUT AND LV SUPPLY CABLE TERMINALS	300mm	FULL EARTH BAR	BUSBAR RATING IN AMPS
		HALF-RECESSED	IP44	FIBREGLASS	1.6mm	FACE PLATE - PURPLE (P2)	PERANO	REMOVABLE PANELS	UNISTRUT FOR CLAMPS	BETWEEN GRAND PLATE AND TERMINALS	300mm	EARTH STUD	BUSBAR FAULT LEVEL
CIRCUIT DISTRIBUTION SECTIONS	FORM 2B	SURFACE MOUNTED	IP54	MILD STEEL	2mm	SEPARATED DIVISIONS	BRASS	REMOVABLE HOUSING	3mm min 316L SS GLAND PLATE	MAXIMUM DB SIZE	REFER TO SPECIFICATION	ADDITIONAL EARTH STUD	COPPER
		FLOOR STANDING	IP55	ELECTRO GALVANISED		MATERIAL FINISH	NORMAL	LOCKING MECHANISM	CABLE EXT	WASHERS ETC. MATERIAL	HEIGHT	NEUTRAL BAR	THINNED COPPER
		POLE MOUNTED	IP65	316L STAINLESS STEEL				3 POINT SS	MILD STEEL	WIDTH	FULL NEUTRAL BAR	ALUMINIUM	
		CROSS-ARM MOUNTED	IP66	316L STAINLESS STEEL				STD. PERANO TYPE	UNISTRUT FOR K CLAMPS	MAX INSTALLATION HEIGHT	HALF NEUTRAL BAR	INSULATED BUSBAR	
		WALL MOUNTED	IP68	316L STAINLESS STEEL				SQUARE KEY TYPE	3mm min 316L SS GLAND PLATE		NEUTRAL STUD		

AWAITING FINAL DESIGN INFORMATION ON THE FOLLOWING:

- MV SWITCHGEAR
- PROTECTION
- METERING

**LEGEND:**

- 30A TRIPLE-POLE BREAKER CURRENT RATING AS SHOWN.
- 30A DOUBLE-POLE BREAKER CURRENT RATING AS SHOWN.
- 30A SINGLE-POLE BREAKER CURRENT RATING AS SHOWN.
- 30A TRIPLE-POLE ISOLATOR CURRENT RATING AS SHOWN.
- 30A DOUBLE-POLE ISOLATOR CURRENT RATING AS SHOWN.
- 30A SINGLE-POLE ISOLATOR CURRENT RATING AS SHOWN.
- 30A ROTARY BYPASS SWITCH CURRENT RATING AS SHOWN.
- 30A ISOLATOR-TYPE EARTH LEAKAGE
- 30A BREAKER-TYPE EARTH LEAKAGE
- 30A BIPOLAR-TYPE EARTH LEAKAGE
- 30A 3P 3A CONTACTOR
- ELECTRONIC TIMER TIMING RANGE: 0.3 - 10 min
- 30A 1P 3A ROTARY BYPASS SWITCH RATING AS SHOWN
- PHOTO ELECTRIC SWITCH
- Cu BUSBAR RATING AS SHOWN
- TERMINAL
- CONDUIT SIZE OR NO. OF CORES TO A CABLE
- CABLE SIZE
- SIZE OF INSULATED EARTH (BARE ONLY IF OTHERWISE SPECIFIED)

**ABBREVIATIONS:**

- AC ALTERNATING CURRENT
- Cu COPPER
- DB DISTRIBUTION BOARD
- DC DIRECT CURRENT
- DOUBLE-POLE
- KA KILO AMPERE
- kVA KILO VOLT AMPERE
- LS SUBSTATION
- LED LIGHT EMITTING DIODE
- MCB MINUTURE CIRCUIT BREAKER
- MCCB MOLDED CASE CIRCUIT BREAKER
- SS STAINLESS STEEL
- TX TRANSFORMER
- UPS UNINTERRUPTIBLE POWER SUPPLY
- VT VOLTAGE TRANSFORMER

DRAWING NO.	REFERENCE
1	REFERENCE DRAWINGS

- NOTES**
- DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.
  - THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE MEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.
  - ALL MINUTURE CIRCUIT BREAKERS (MCBs) TO BE SABS APPROVED. REFER TO DETAIL SPECIFICATION FOR FURTHER REQUIREMENTS.
  - CONTRACTOR TO SUBMIT DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO THE COMMENCEMENT OF THE MANUFACTURING THEREOF.
  - ALL CIRCUIT BREAKERS: Icu = Ics 100%.
  - ALL SWITCHGEAR CO-ORDINATION - TYPE 2 (FULL CO-ORDINATION).
  - ALL CONTRACTORS TO BE ACS, UNLESS OTHERWISE SPECIFIED.
  - ALL MCBs TO BE CURVE C (STANDARD), UNLESS OTHERWISE SPECIFIED.
  - THE IA RATING OF THE RESPECTIVE CIRCUIT BREAKERS TO MEET THE IA RATING OF THE BUSBAR FROM WHICH IT IS SUPPLIED.
  - FINAL UPS SECTION BREAKER SIZES TO BE FINALISED, BASED ON FINAL UPS SYSTEM DESIGN & PRODUCT.
  - FINAL SURGE ARRESTORS (SIZES) TO BE DETERMINED ONCE THE EARTHING AND LIGHTNING PROTECTION SYSTEM DESIGN HAS BEEN FINALISED.
  - ALL ISOLATORS TO BE OF THE SWITCH-DISCONNECTOR TYPE.
  - ALL CABLES AND CONDUCTORS WITHIN THE SUBSTATION SHALL BE OF THE UNARMED TYPE, UNLESS OTHERWISE SHOWN OR SPECIFIED.
  - CONTRACTOR SHALL ALLOW 30% SPARE SPACE FOR POSSIBLE FUTURE ADDITIONS.

**MASTER**

**21 JUN 2018**

**AECOM**      **TRANSNET**

**AECOM**  
CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1966/006628/07

NO.	DESCRIPTION	BY	CHKD	APPD	DATE
01	ISSUED FOR CONSTRUCTION: • HOLD POINT ADDED • ABBREVIATION LEGEND - ACRONYM 'LED' ADDED • FUSES ADDED • LED PILOT LIGHTS ADDED	DD	BS	BS	2018-06-20
02	ISSUED FOR CONSTRUCTION	DD	BS	BS	2018-03-19

**REVISIONS**

This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
<b>OPERATING DIVISIONS</b>		<b>PR.ENG. / PR.TECH./PR. ARCH</b>	
TITLE	NAME	TITLE	NAME
SCALE: 1:1		SCALE: 1:1	

**TRANSNET CAPITAL PROJECTS**

TRANSNET LTD (CHINA) AS TRANSNET CAPITAL PROJECTS: REG. NO. 195500000000  
TABLE BAY BUILDINGS, TYGERBERG PARK,  
163 LYS BORGE DRIVE, PLATTENBERG,  
8001      TEL: 021 949 1999  
FAX: 021 677 2455

**PORT OF SALDANHA**

**IRON ORE TIPLER 3 PROJECT**

**BULK POWER UPGRADE:**

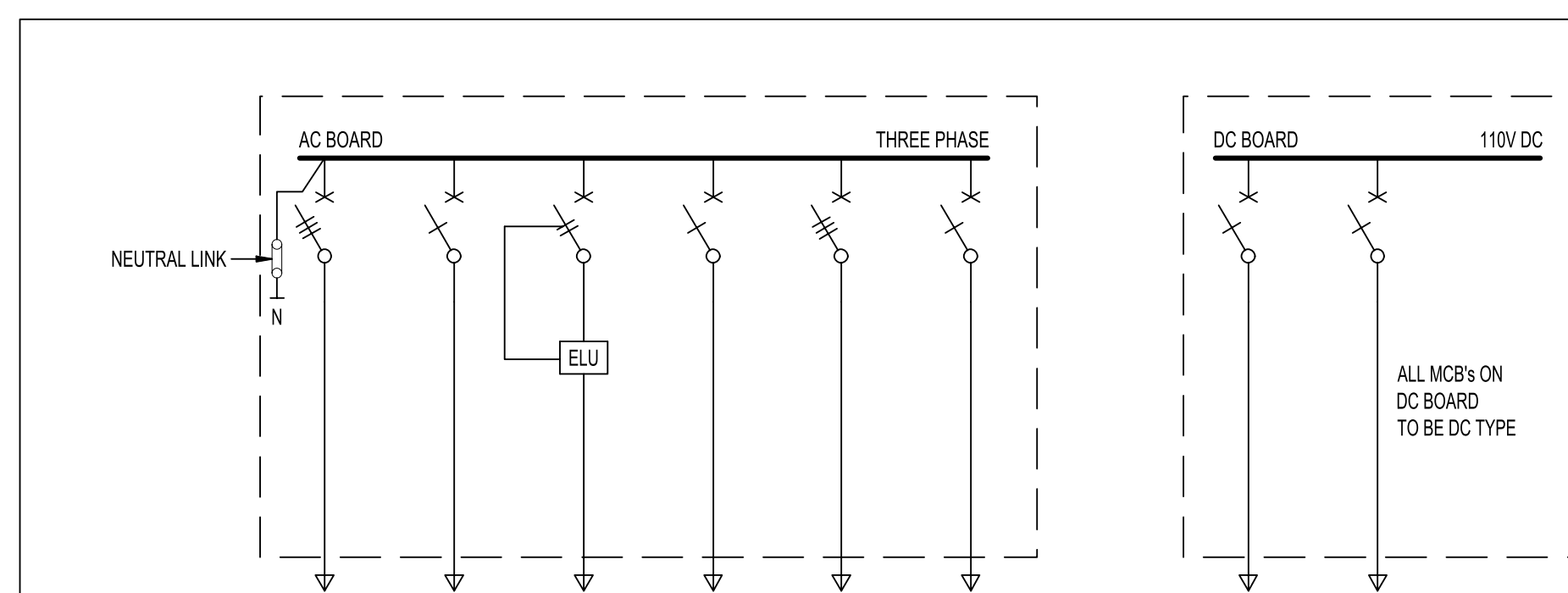
**NEW MAIN INTAKE SUBSTATION**

**SINGLE LINE DIAGRAM**

**MV EQUIPMENT SUB DISTRIBUTION BOARD (SDB-MVE)**

PROJECT NUMBER: 001    SUB TYPE: 001    DRAWING NO: 001    SHEET: 01    REV: 01

19 | 24 | 70 | 12 | 30 | 0 | E | S | L | 0 | 0 | 1 | 4 | 0 | 1 | 0 | 1 | AE



LABEL	INCOMER	LIGHTS	SOCKET OUTLETS	WATER TANK PUMP	FAN SUPPLY	BATTERY ROOM	SPARE x 1
CIRCUIT No.		1	2	3	4	5	
PHASE ALLOCATION	R-W-B	R	W	B	R-W-B	R	
CONDUCTOR - mm <sup>2</sup>	2 x 2.5mm <sup>2</sup> & 1.5mm <sup>2</sup> EARTH	2 x 4.0mm <sup>2</sup> & 2.5mm <sup>2</sup> EARTH	TBC	3 x 4.0mm <sup>2</sup> & 2.5mm <sup>2</sup> EARTH	2 x 2.5mm <sup>2</sup> & 1.5mm <sup>2</sup> EARTH		
CONDUT. DIA.	CABLE BY ESKOM	20mm DIA.	AS CIR. 1	TBC	20mm DIA.	20mm DIA.	
M.C.B. RATING - AMPS	60	10	20	TBC	10	10	

DISTRIBUTION BOARDS DIAGRAM

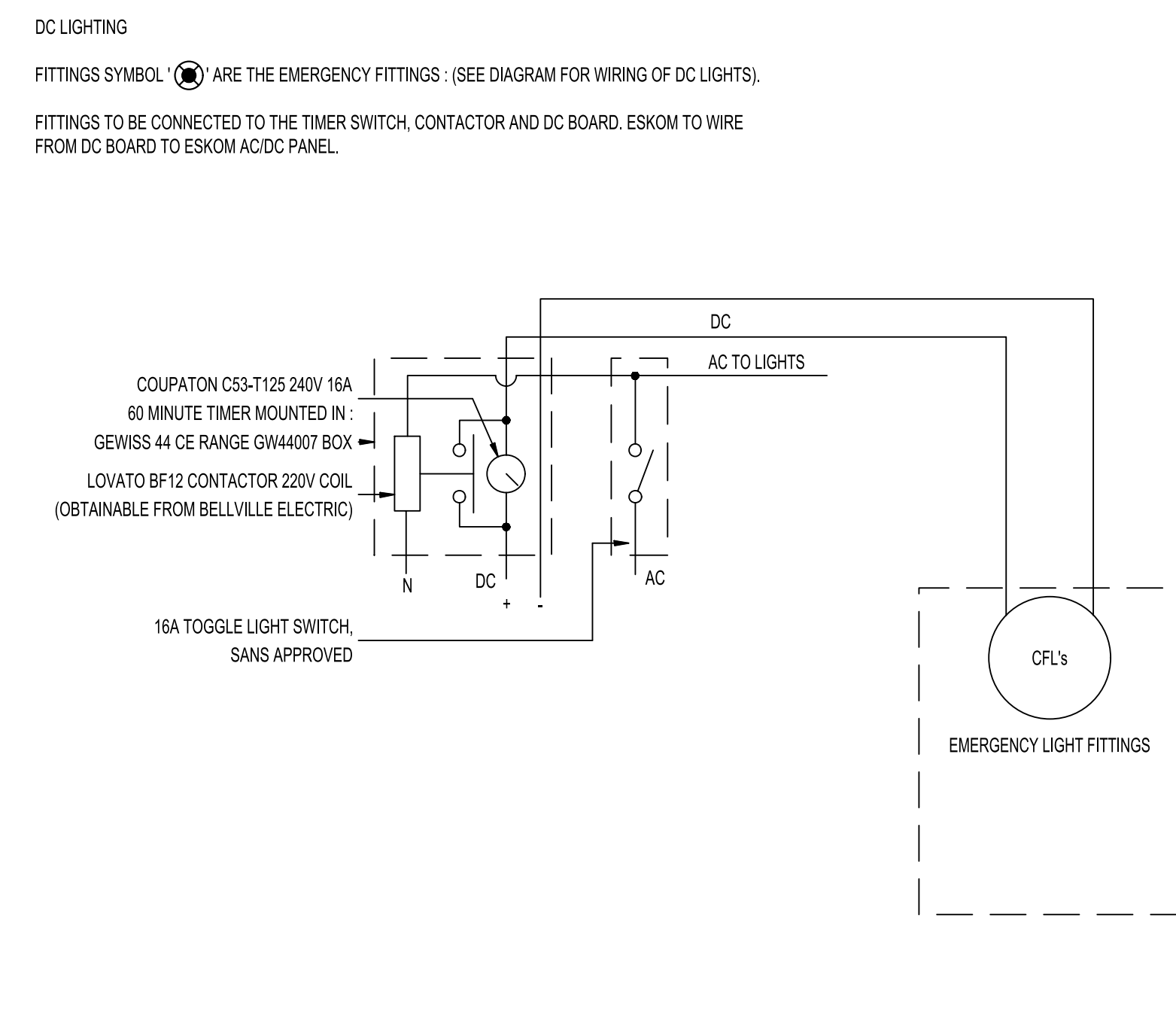


DIAGRAM SHOWING THE CONNECTION BETWEEN THE EMERGENCY LIGHT FITTING, CONTACTOR & TIMER

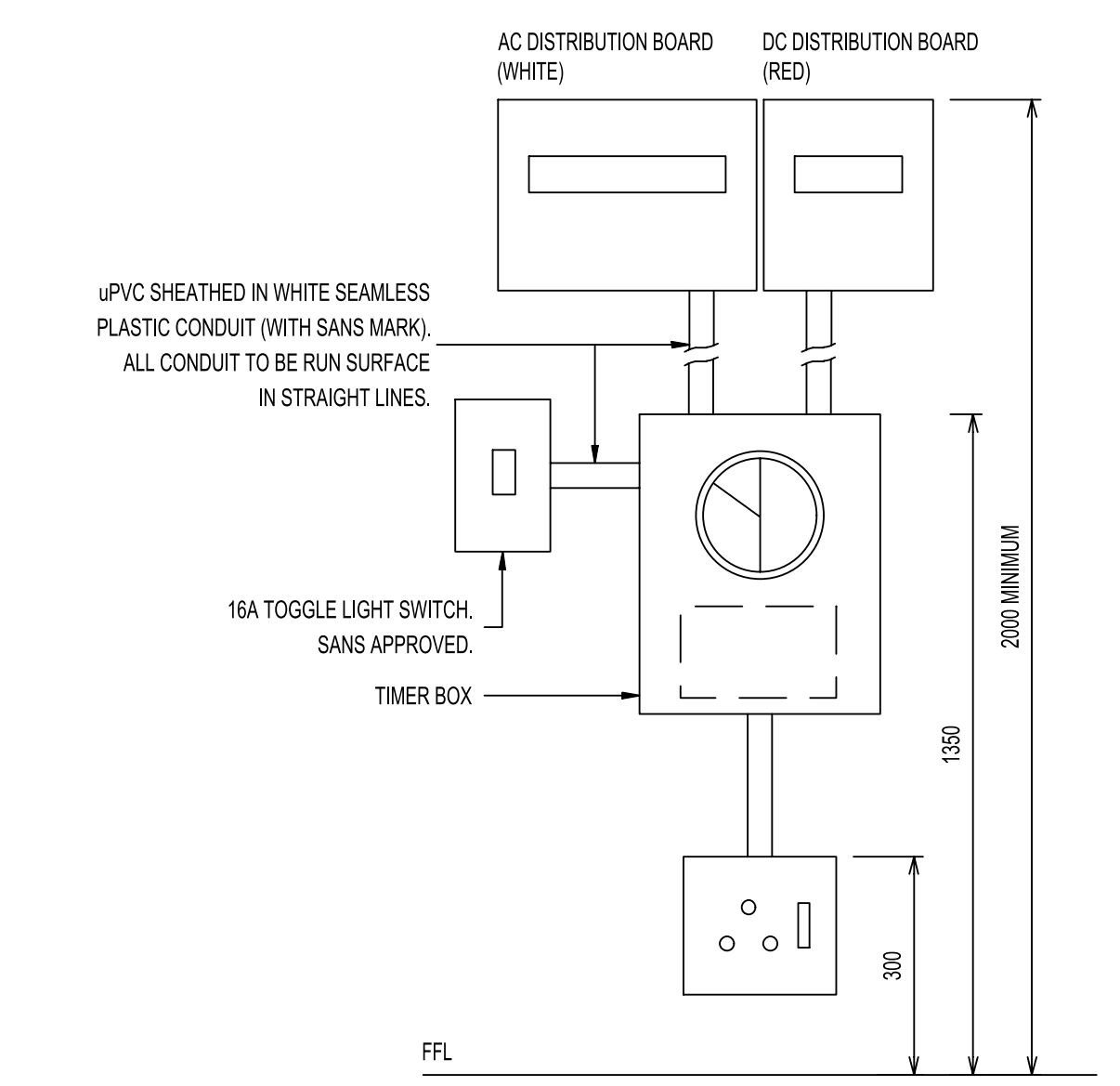


DIAGRAM SHOWING THE TIMER BOX IN COMPARISON TO THE AC LIGHT SWITCH

ELECTRICAL SPECIFICATION							
GENERALLY, ALL ELECTRICAL WORK TO BE CARRIED OUT IN STRICT ACCORDANCE WITH THE LATEST REVISIONS OF SANS 10142-1:2003 THE WIRING OF PREMISES.							
A. ELECTRICAL LEGEND							
[Symbol]	5W LED R-BAY 5W LED AS LASON BY VOLTEX LIGHTING.						
AMOUNT REQUIRED	003	PLACEMENT	WALL		CEILING SURFACE MOUNTED		✓
[Symbol]	47W 4000K NORDLAND JBLED IP68 RATED ZONE 2 LUMINAIRE, INCLUDING FOR Ex e CERTIFICATION						
AMOUNT REQUIRED	002	PLACEMENT	WALL @ 2800mm		CEILING SURFACE MOUNTED		✓
[Symbol]	17.5W LED LASON RIMN-17 5W LED EYELED IP68 RATED COLOUR WHITE.						
AMOUNT REQUIRED	002	PLACEMENT	WALL @ 2800mm		CEILING SURFACE MOUNTED		✓
[Symbol]	DTC CLEAR HIGH VISOR BULKHEAD FITTING BY VOLTEX. BULB: 32W TORNADO TWISTED WITH INTEGRATED BALLAST. TO BE CONNECTED TO DC BOARD AND COUPATON CS5-T125 240V 16A 60 MINUTE TIMER.						
AMOUNT REQUIRED	003	PLACEMENT	WALL @ 2800mm		CEILING SURFACE MOUNTED		✓
[Symbol]	RED: DC (EMERGENCY LIGHTS) SURFACE MOUNTED DISTRIBUTION BOARD. PLACED NEXT TO AC BOARD. TOP OF BOARD MOUNTED MIN. 200mm ABOVE FLOOR LEVEL. TO BE CONNECTED TO DC LIGHTS AND COUPATON CS5-T125 240V 16A 60 MINUTE TIMER.						
AMOUNT REQUIRED	001	PLACEMENT	WALL @ 2200mm				✓
[Symbol]	WHITE: AC (PRIMARY LIGHTS) SURFACE MOUNTED DISTRIBUTION BOARD. PLACED NEXT TO DC BOARD. TOP OF BOARD MOUNTED MIN. 200mm ABOVE FLOOR LEVEL. TO BE CONNECTED TO AC LIGHT FITTINGS.						
AMOUNT REQUIRED	001	PLACEMENT	WALL @ 2200mm				✓
[Symbol]	TO BE METAL CLAD 4 WAY SURFACE MOUNTED AS HENEMANN WITHOUT DOOR. FRONT COVER TO ALLOW OPERATION OF DOLLIES WITHOUT REMOVAL. BOARD TO BE LABELED TO ESKOM ACDC PANEL BY ESKOM WITHOUT REMOVAL.						
AMOUNT REQUIRED	001	PLACEMENT	WALL @ 2200mm				✓
[Symbol]	MCBs TO BE CLEARLY NAMED AS TO CIRCUIT AND USE & TO HAVE 6KA RATING. EARTH LEAKAGE UNIT TO BE HY-48AG OR EQUAL APPROVED.						
AMOUNT REQUIRED	001	PLACEMENT	WALL @ 2200mm				✓
[Symbol]	GEWISS 8000.7519 WATER TIGHT TOGGLE TYPE SWITCH WITH RED PLOT LIGHT. SANS APPROVED						
AMOUNT REQUIRED	004	PLACEMENT	WALL @ 1350mm				✓
[Symbol]	16A TOGGLE LIGHT SWITCH. SANS APPROVED						
AMOUNT REQUIRED	001	PLACEMENT	WALL @ 1350mm				✓
[Symbol]	COUPATON CS5-T125 240V 16A 60 MINUTE TIMER MOUNTED IN GEWISS 44 CE RANGE GWH4007 BOX WITH LOVATO BF12 CONTACTOR 220V COIL (OBTAINABLE FROM BELLVILLE ELECTRIC)						
AMOUNT REQUIRED	001	PLACEMENT	WALL @ 1350mm				✓
[Symbol]	TELEPHONE OUTLET WITH 25mm CONDUIT TO CABLE TRAY OVER						
AMOUNT REQUIRED	001	PLACEMENT	WALL @ 1350mm				✓
[Symbol]	16A SURFACE MOUNTED INDUSTRIAL SOCKET OUTLET (3 PIN ROUND)						
AMOUNT REQUIRED	001	PLACEMENT	WALL @ 300mm				✓
[Symbol]	WEATHERPROOF TRIP-POLE ISOLATOR TO BE SIZED GREATER THAN SUPPLY BREAKER						
AMOUNT REQUIRED	001	PLACEMENT	WALL @ 2245mm				✓
[Symbol]	EXTRACTOR FAN SPECIFICATIONS:						
VOLTAGE:	400V						
FREQUENCY:	50Hz						
PHASE:	3						
INSULATION CLASS:	F						
ENCLOSURE CLASS, MOTOR:	IP44						
CERTIFICATE:	ZELM 06ATE0270X						
EXTRACTION PROFF:	# 20 x 60 # RQ 74						
MINIMUM NO. OF AIR CHANGES REQUIRED:	5.5 TIMES/HR						
AMOUNT REQUIRED	001	PLACEMENT	WALL @ 2245mm				✓
[Symbol]	HYDROGEN GAS DETECTOR - MAIN CONTROL						
AMOUNT REQUIRED	001	PLACEMENT	WALL @ 1600mm				✓
[Symbol]	HYDROGEN GAS DETECTOR - SENSOR						
AMOUNT REQUIRED	002	PLACEMENT	AS INDICATED ON LAYOUT				✓

NOTES:

TABLE 1-SAFETY SIGNS REQUIRED FOR BATTERY ROOMS

DESCRIPTION	REQUIRED LOCATION OF SAFETY SIGN	Eskom CODE AND DRAWING NUMBER
A) A NOTICE IDENTIFYING THE ROOM AS BEING A BATTERY ROOM AND ITS TYPE OF HAZARDOUS CLASSIFICATION (ZONE 2).	AT THE DESIGNATED ENTRANCE TO THE BATTERY ROOM.	DCSS 1 : D-01-0022 SHEET 1
B) IT CLEARLY SETS OUT THE ELEMENTARY FIRST AID PROCEDURES IN THE CASE OF EYE AND/OR SKIN CONTACT WITH AN ACID OR ALKALI.		
C) A NO-SMOKING PROHIBITIVE SIGN AND CORROSIVE SUBSTANCE WARNING SIGN ARE ALSO POSTED ON THE NOTICE.		
D) THE NOTICE ALSO DISPLAYS THAT UNAUTHORIZED ENTRY TO THE BATTERY ROOM IS PROHIBITED.		
A) THIS NOTICE SHOWS THAT OPEN FLAMES ARE PROHIBITED INSIDE THE BATTERY ROOM.	ON WALL DIRECTLY OPPOSITE THE ENTRANCE TO THE BATTERY ROOM.	DCSS 3 : D-01-0022 SHEET 3
B) IT ALSO SHOWS THAT AN APRON, EYE PROTECTION AND GLOVES SHALL BE WORN.		
A NOTICE INDICATING THE LOCATION OF THE EYE WASH EQUIPMENT.		GA 19 : D-01-0023 SHEET 2
A NOTICE SHOWING THAT THE DRINKING OF WATER IS PROHIBITED (WHEN APPLICABLE).	ON WALL DIRECTLY ABOVE BATTERY ROOM SINK OR WATER CONTAINER.	PV 5 : D-01-0023 SHEET 3
BATTERY ROOM CIVILS TO COMPLY WITH SPECIFICATION FOR BATTERY ROOMS.		DSP 34-79

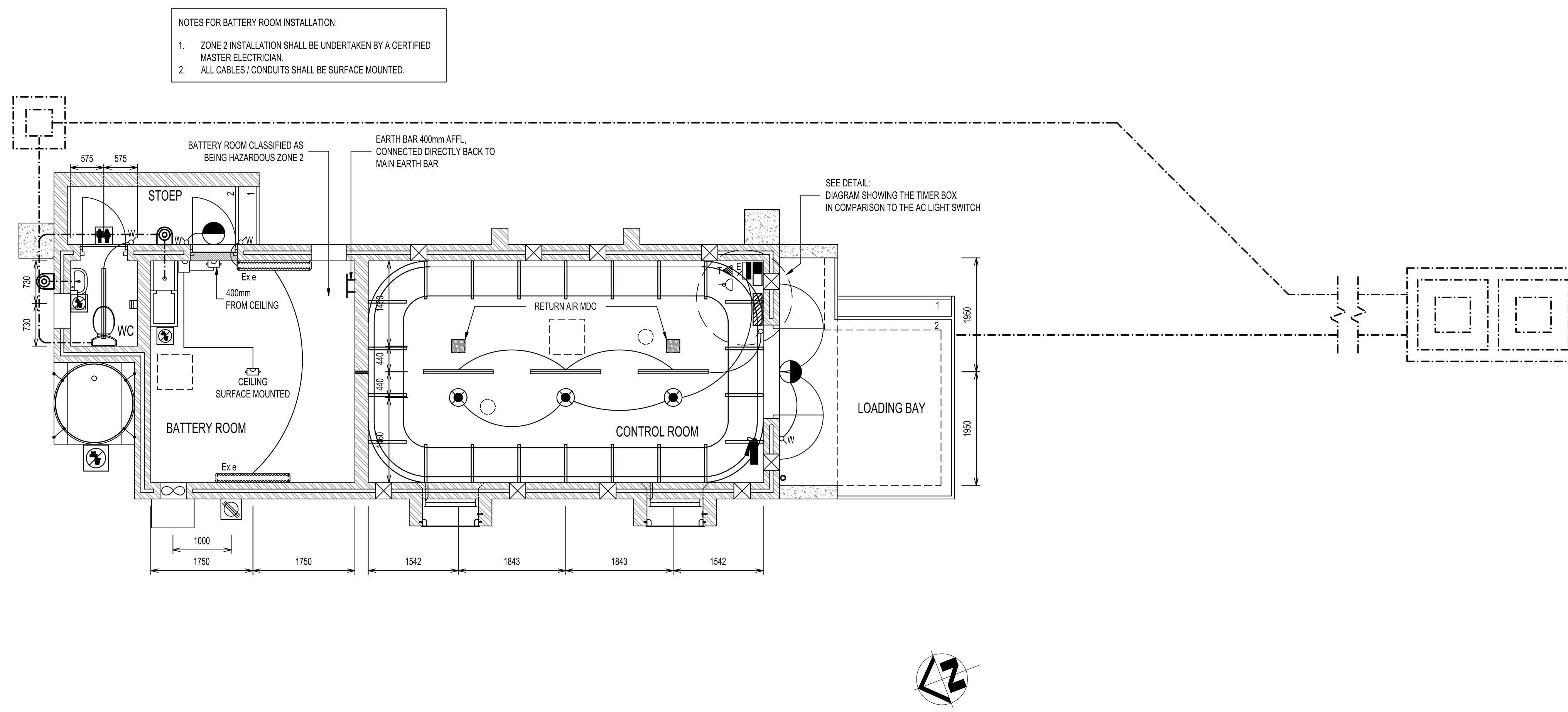
LEGEND - BATTERY ROOM FITTINGS:

N.B. : SUPPLIED PIPING TO BE EITHER COPPER OR POLYCOB WITH SABS MARK.

- 1 x white glazed DRAINER ON WALL BRACKETS ON DOOR SIDE. DRAINER TO DRAIN DIRECTLY INTO SINK.
- HAND SHOWER TO COBRA No. 519-21. COMPLETE WITH TRIGGER ACTION CONTROL NOZZLE. WALL BRACKET, HOSE & CP WALL MOUNTED ELBOW ACTION TAP.
- WALL MOUNTED ELBOW ACTION TAP WITH THREADED SPOUT.
- WHITE GLAZED 600 x 400 x 200mm LABORATORY SINK AS VIAL CODE 2260 OR EQUALLY APPROVED. COMPLETE WITH WALL BRACKETS, PLUG & CHAIN. 38mm DIA. ACID RESISTANT WASTERPE.
- PVS P-TRAP.
- 38mm DIA. ACID RESISTANT WASTERPE TO DISCHARGE WASTE WATER OUTSIDE. SUPPORTED WITH HALVED PIPE HOLDER.

B. MISCELLANEOUS LEGEND:

AMOUNT REQUIRED	PLACEMENT	WALL @	AMOUNT REQUIRED	PLACEMENT	WALL @
001	PLACEMENT	WALL @ 1460mm	001	PLACEMENT	WALL @ 1460mm



NOTES:

1. DO NOT SCALE DRAWING - ONLY DIMENSIONS SHOWN TO BE USED.

2. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS AND LEVELS ON THE SITE AND NOTIFY THE NEC SUPERVISOR OF ANY VARIATIONS BEFORE CONSTRUCTION.

DRAWING NO.	REFERENCE



CAPE TOWN OFFICE  
WATERSIDE PLACE, SOUTH GATE  
TYGER WATERFRONT  
CARL CRONJE DRIVE  
TEL: +27 (0)21 950 7500  
FAX: +27 (0)21 950 7502  
REG. NO. 1966/006628/07

TITLE	NAME	SIGN	DATE
DRAWN	KS	[Signature]	21 09 05
CHECKED	DD	[Signature]	21 09 05
DESIGNED	CP	[Signature]	21 09 05
CHECKED	LK	[Signature]	21 09 05

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	
TITLE	NAME	DATE	DATE
00	ISSUED FOR CONSTRUCTION	KS	LK
NO.	DESCRIPTION	BY	CHKD
REVISIONS			
This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.			
REG. NUMBER	201270126	DATE	21 09 05
SCALE:	AS SHOWN		



CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	
TITLE	NAME	DATE	DATE
00	ISSUED FOR CONSTRUCTION	KS	LK
NO.	DESCRIPTION	BY	CHKD
REVISIONS			
This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.			
REG. NUMBER	201270126	DATE	21 09 05
SCALE:	AS SHOWN		

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	
TITLE	NAME	DATE	DATE
00	ISSUED FOR CONSTRUCTION	KS	LK
NO.	DESCRIPTION	BY	CHKD
REVISIONS			
This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.			
REG. NUMBER	201270126	DATE	21 09 05
SCALE:	AS SHOWN		

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	
TITLE	NAME	DATE	DATE
00	ISSUED FOR CONSTRUCTION	KS	LK
NO.	DESCRIPTION	BY	CHKD
REVISIONS			
This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.			
REG. NUMBER	201270126	DATE	21 09 05
SCALE:	AS SHOWN		

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	
TITLE	NAME	DATE	DATE
00	ISSUED FOR CONSTRUCTION	KS	LK
NO.	DESCRIPTION	BY	CHKD
REVISIONS			
This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.			
REG. NUMBER	201270126	DATE	21 09 05
SCALE:	AS SHOWN		

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	
TITLE	NAME	DATE	DATE
00	ISSUED FOR CONSTRUCTION	KS	LK
NO.	DESCRIPTION	BY	CHKD
REVISIONS			
This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.			
REG. NUMBER	201270126	DATE	21 09 05
SCALE:	AS SHOWN		

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	
TITLE	NAME	DATE	DATE
00	ISSUED FOR CONSTRUCTION	KS	LK
NO.	DESCRIPTION	BY	CHKD
REVISIONS			
This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.			
REG. NUMBER	201270126	DATE	21 09 05
SCALE:	AS SHOWN		

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	
TITLE	NAME	DATE	DATE
00	ISSUED FOR CONSTRUCTION	KS	LK
NO.	DESCRIPTION	BY	CHKD
REVISIONS			
This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.			
REG. NUMBER	201270126	DATE	21 09 05
SCALE:	AS SHOWN		

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	
TITLE	NAME	DATE	DATE
00	ISSUED FOR CONSTRUCTION	KS	LK
NO.	DESCRIPTION	BY	CHKD
REVISIONS			
This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.			
REG. NUMBER	201270126	DATE	21 09 05
SCALE:	AS SHOWN		

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	
TITLE	NAME	DATE	DATE
00	ISSUED FOR CONSTRUCTION	KS	LK
NO.	DESCRIPTION	BY	CHKD
REVISIONS			
This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.			
REG. NUMBER	201270126	DATE	21 09 05
SCALE:	AS SHOWN		

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	
TITLE	NAME	DATE	DATE
00	ISSUED FOR CONSTRUCTION	KS	LK
NO.	DESCRIPTION	BY	CHKD
REVISIONS			
This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.			
REG. NUMBER	201270126	DATE	21 09 05
SCALE:	AS SHOWN		

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	
TITLE	NAME	DATE	DATE
00	ISSUED FOR CONSTRUCTION	KS	LK
NO.	DESCRIPTION	BY	CHKD
REVISIONS			
This document including all design and information therein is Confidential Intellectual Property of Transnet. Copyright and all other rights are reserved by Transnet. This document may only be used for its intended purpose.			
REG. NUMBER	201270126	DATE	21 09 05
SCALE:	AS SHOWN		

CONTRACTOR / CONSULTANT		TRANSNET CAPITAL PROJECTS	
TITLE	NAME	TITLE	NAME
OPERATING DIVISIONS		PR. ENG. / PR. TECH. / PR. ARCH	