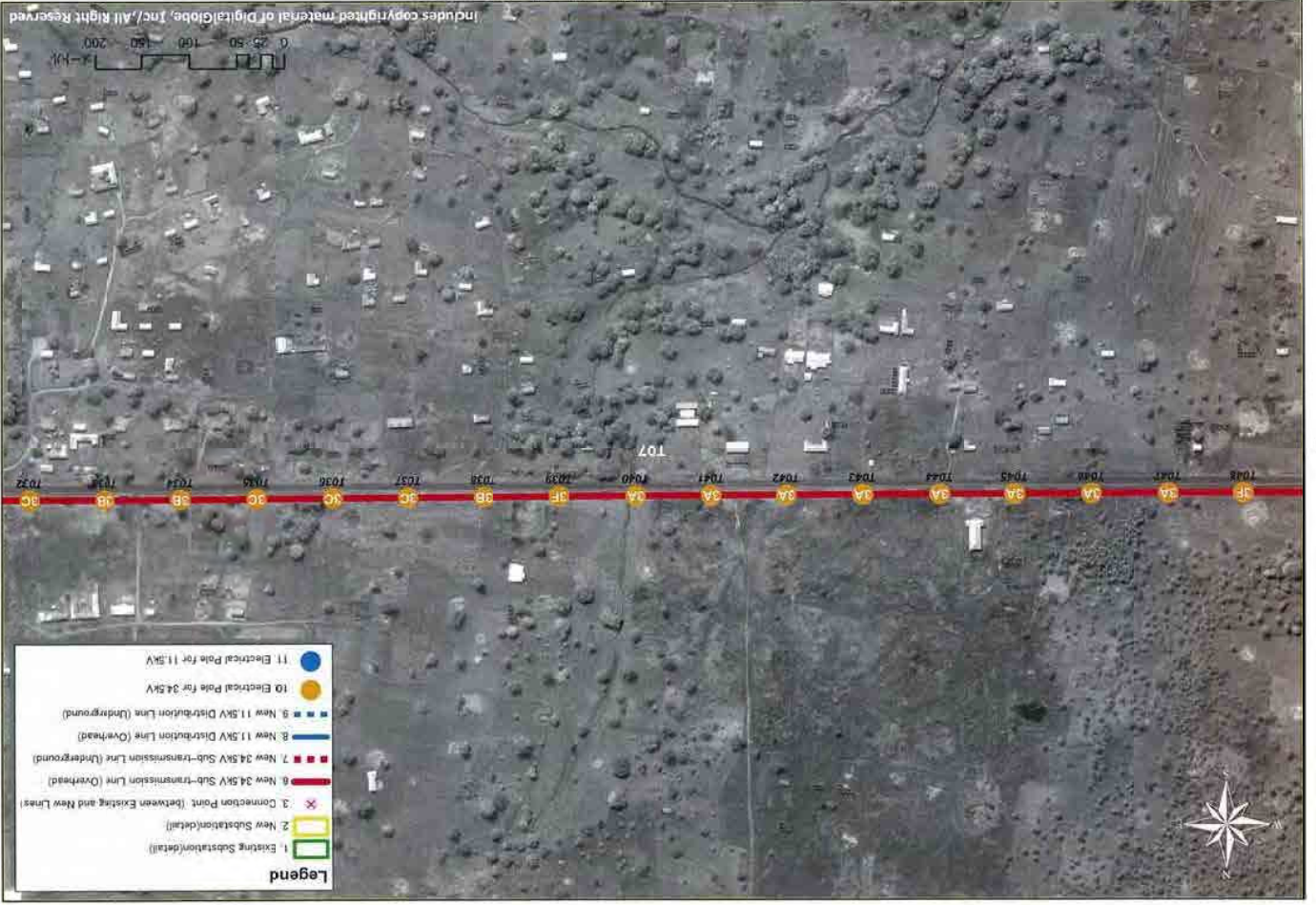


Route Map of Tamale Distribution System



51

Route Map of Tamale Distribution System



50

Route Map of Tamale Distribution System



53

Route Map of Tamale Distribution System

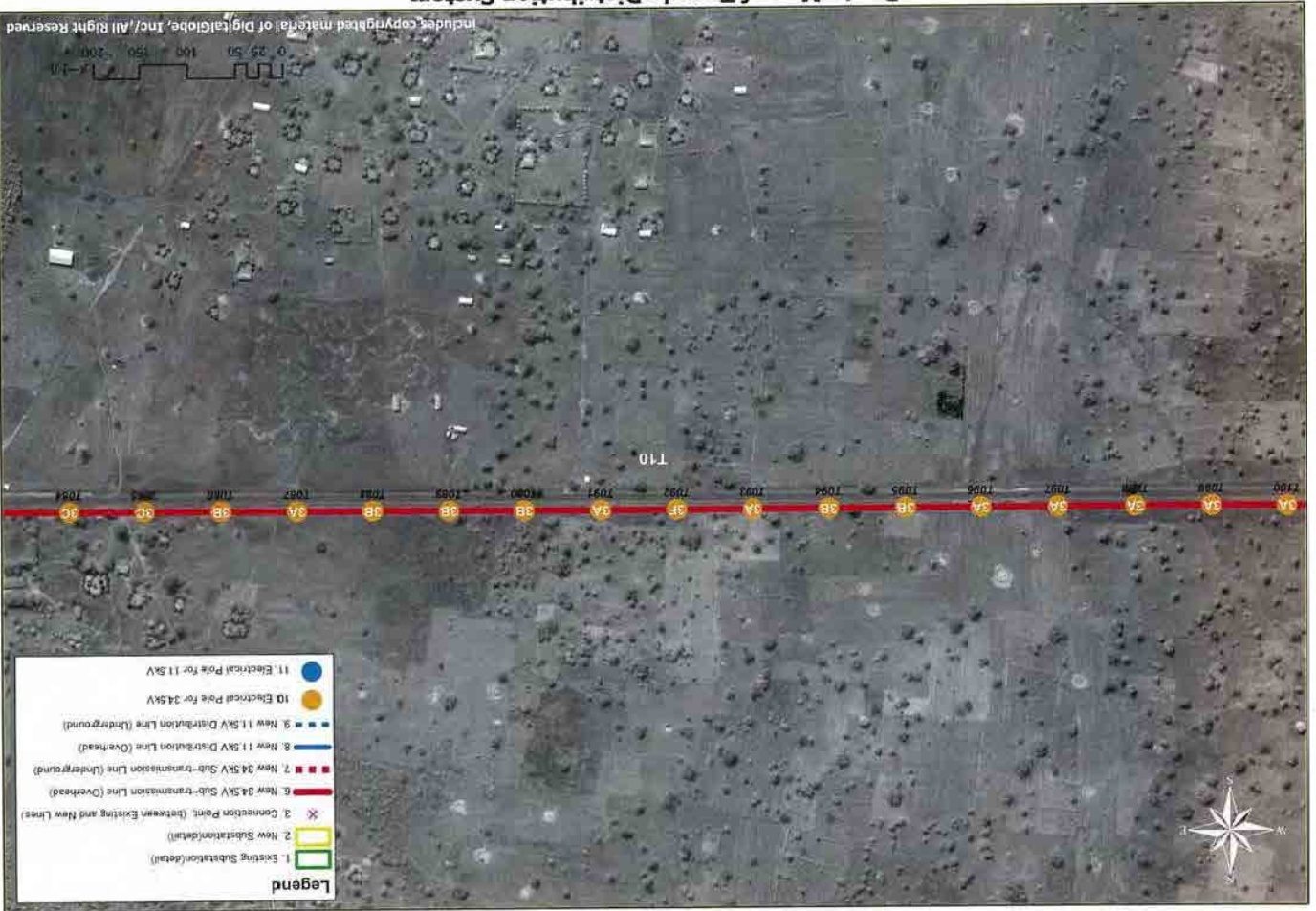


52

Route Map of Tamale Distribution System



Route Map of Tamale Distribution System

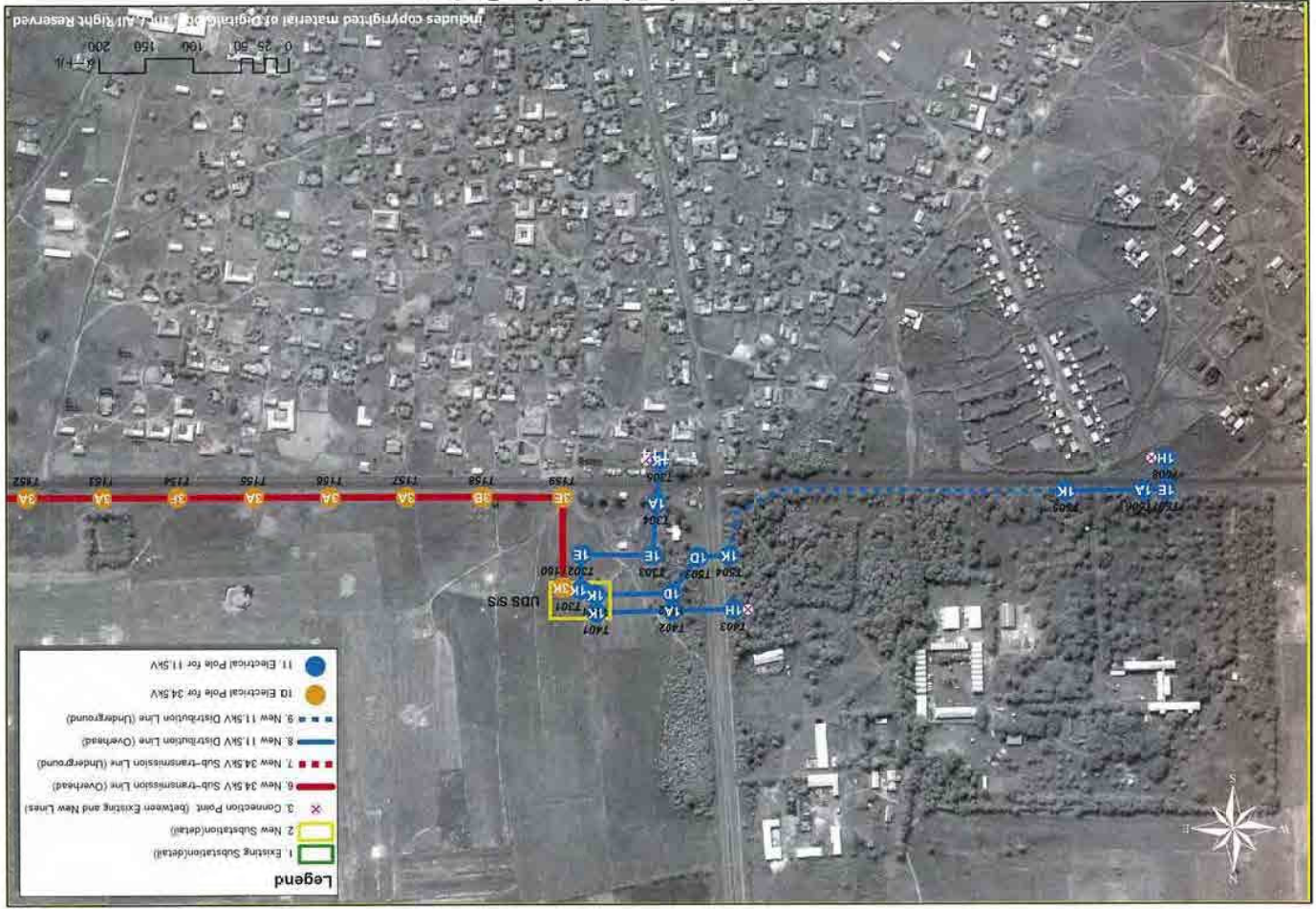


Route Map of Tamale Distribution System



Route Map of Tamale Distribution System





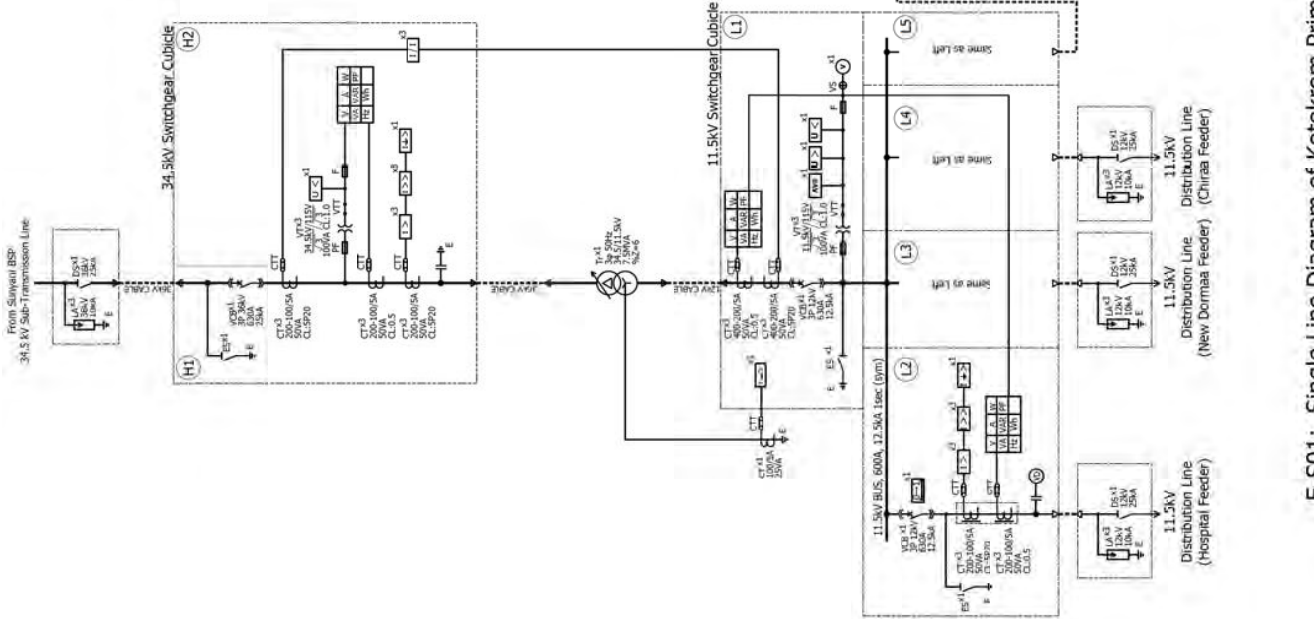
DRAWINGS

PART 2 Improvement of Sunyani Distribution System in Brong-Ahafo Region

1. 34.5/11.5 kV Network Diagram

LEGEND

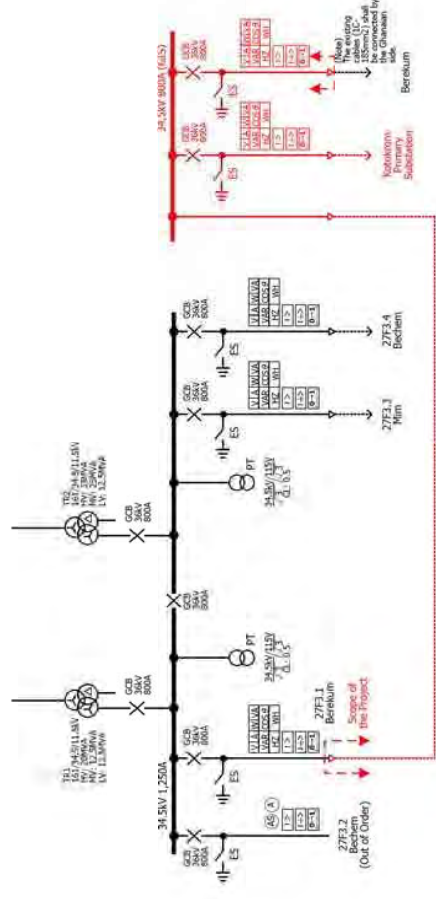
| | |
|-------|---------------------------|
| 1.2.5 | Over current relay |
| 1.2.6 | Over current ground relay |
| 8-2.1 | Auto reclosing relay |
| 1.2.4 | Under voltage relay |
| 1.2.5 | Over voltage relay |
| 1.2.6 | Over voltage ground relay |
| 1.2.7 | Auto voltage relay |
| 1.2.8 | Differential relay |



E-S01: Single Line Diagram of Kotokrom Primary Substation

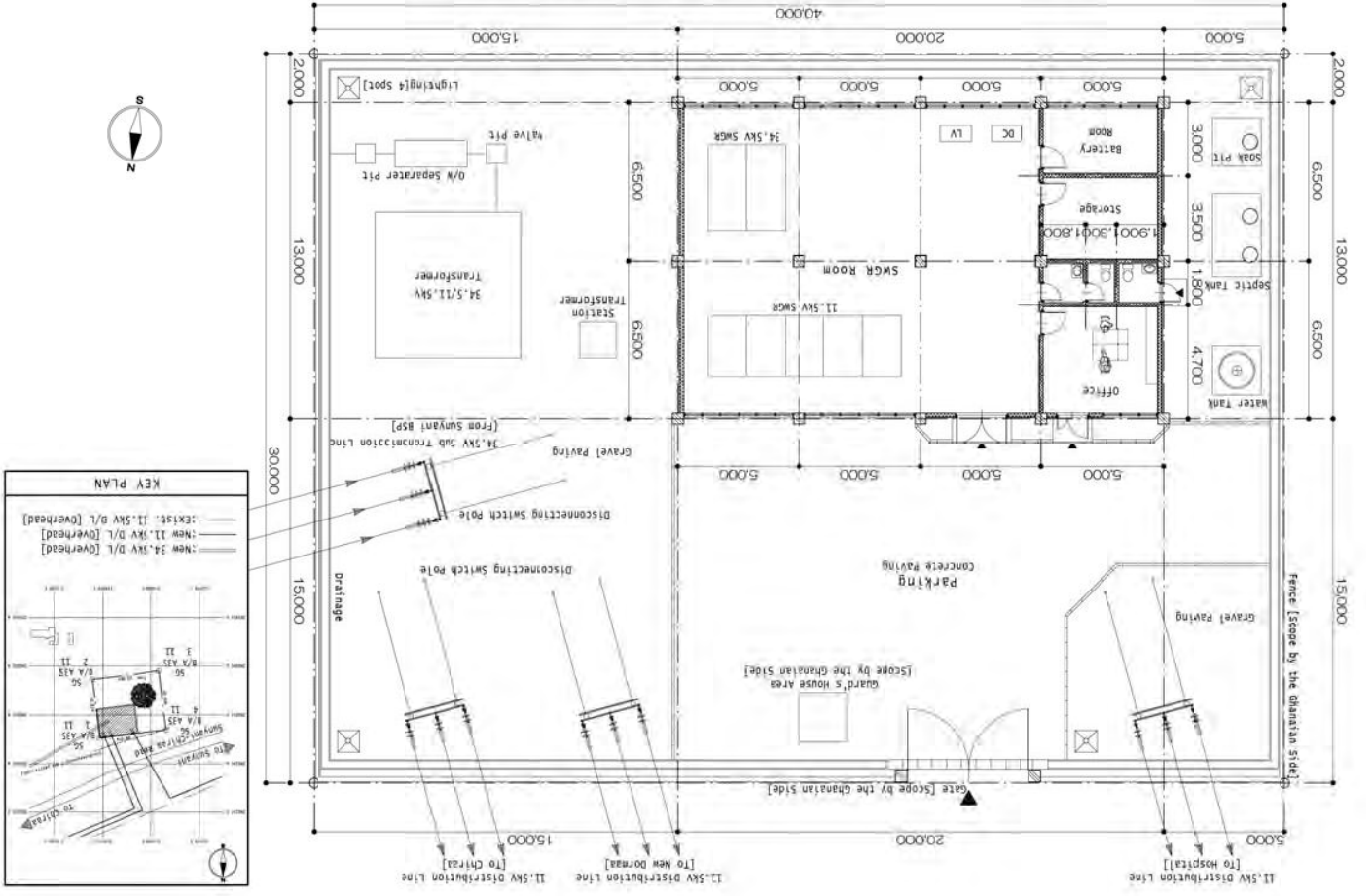
LEGEND

| | |
|-------|---------------------------|
| 1.2.2 | Over current relay |
| 1.2.5 | Over current ground relay |
| 9-2.1 | Auto reclosing relay |



E-S02: Single Line Diagram of Sunyani BSP (Extension of 34.5 kV Feeder)

GENERAL LAYOUT OF KOTOKROM PRIMARY SUBSTATION 1/200

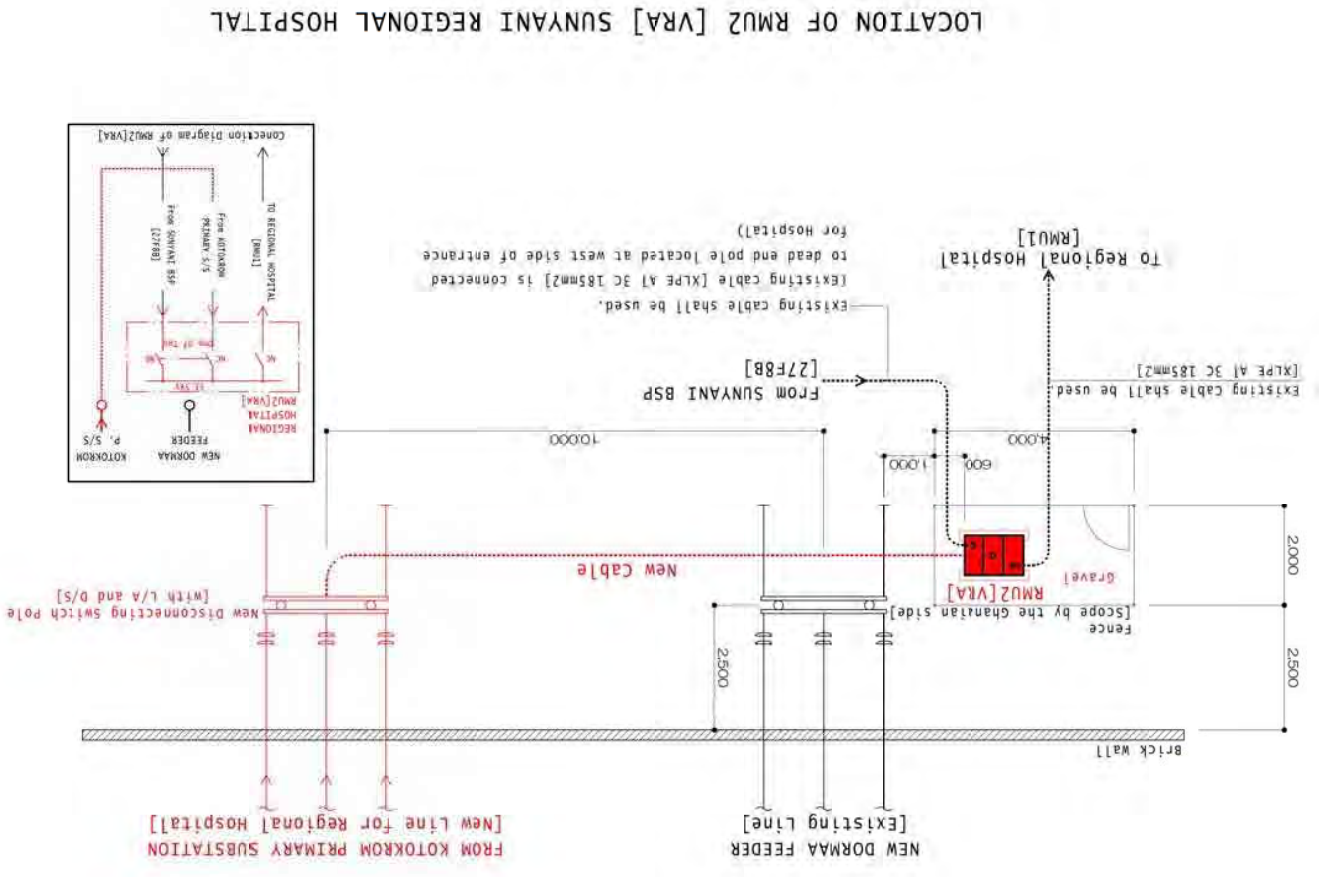


S9

DRAWINGS

**PART 2 Improvement of Sunyani Distribution System
in Brong-Ahafo Region**

3. General Layout

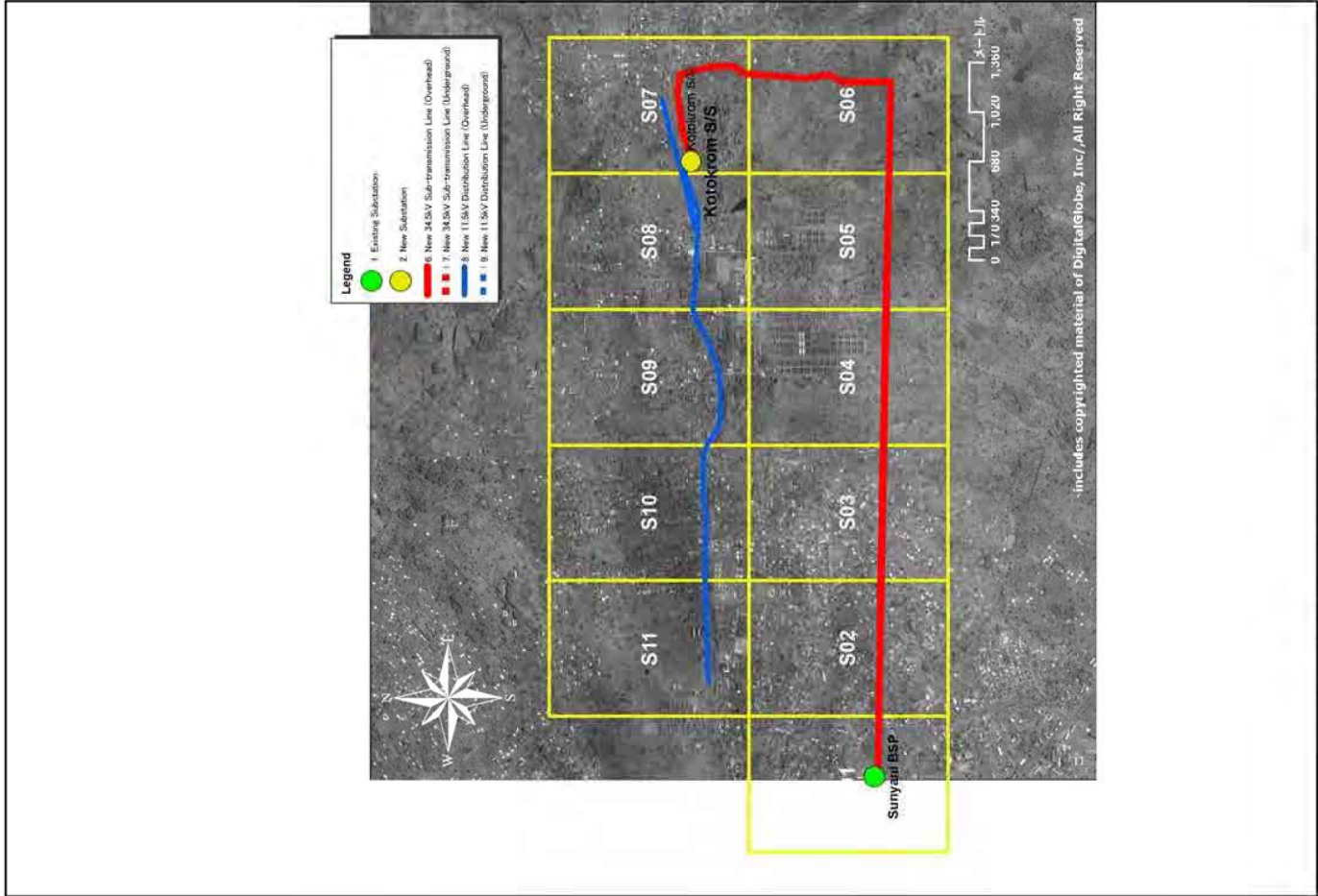


LOCATION OF RMU2 [VRA] SUNYANI REGIONAL HOSPITAL

DRAWINGS

PART 2 Improvement of Sunyani Distribution System in Brong-Ahafo Region

4. Route Map of Distribution System



Route Map of Sunyani Distribution System



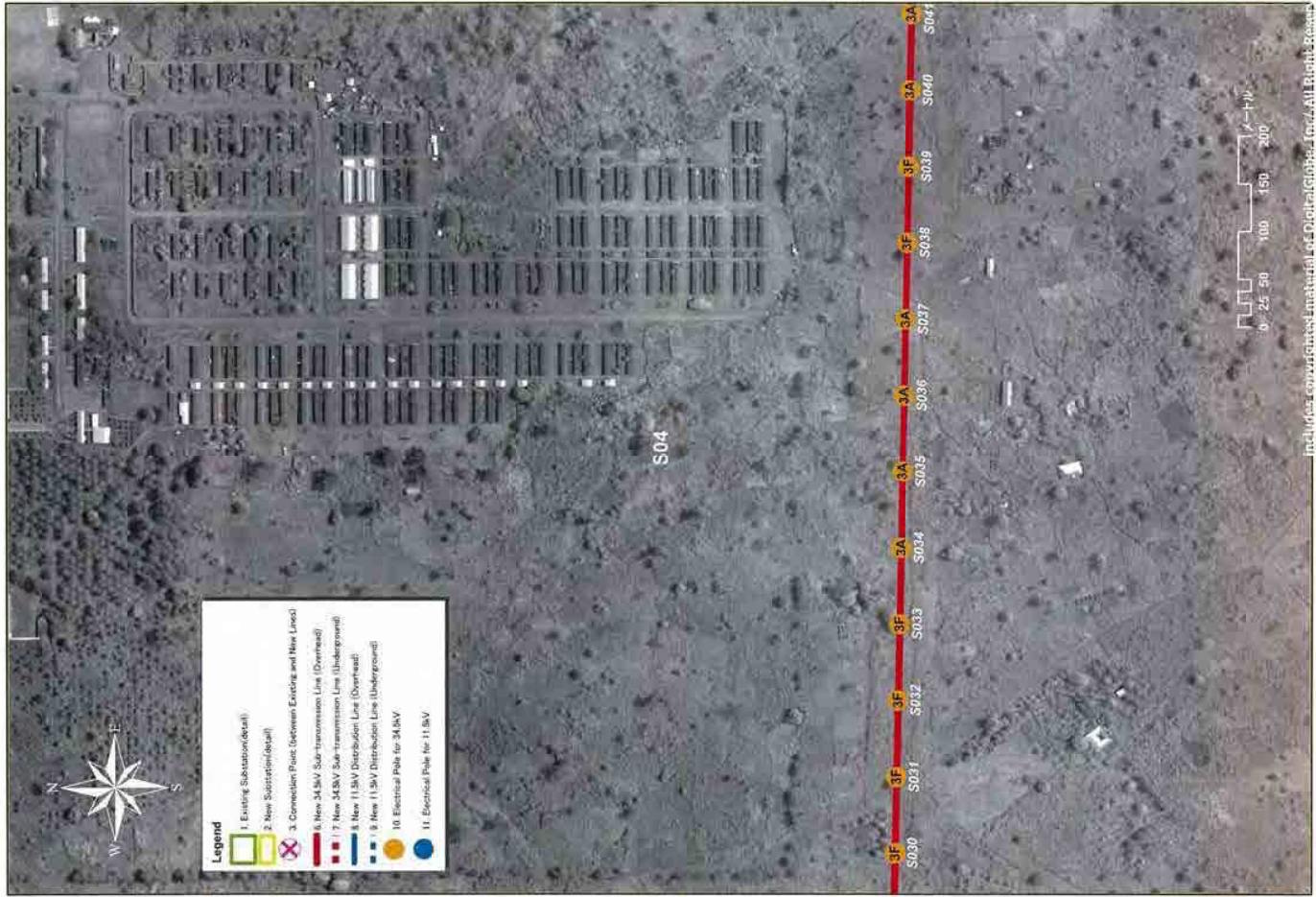
Route Map of Sunyani Distribution System



Route Map of Sunyani Distribution System

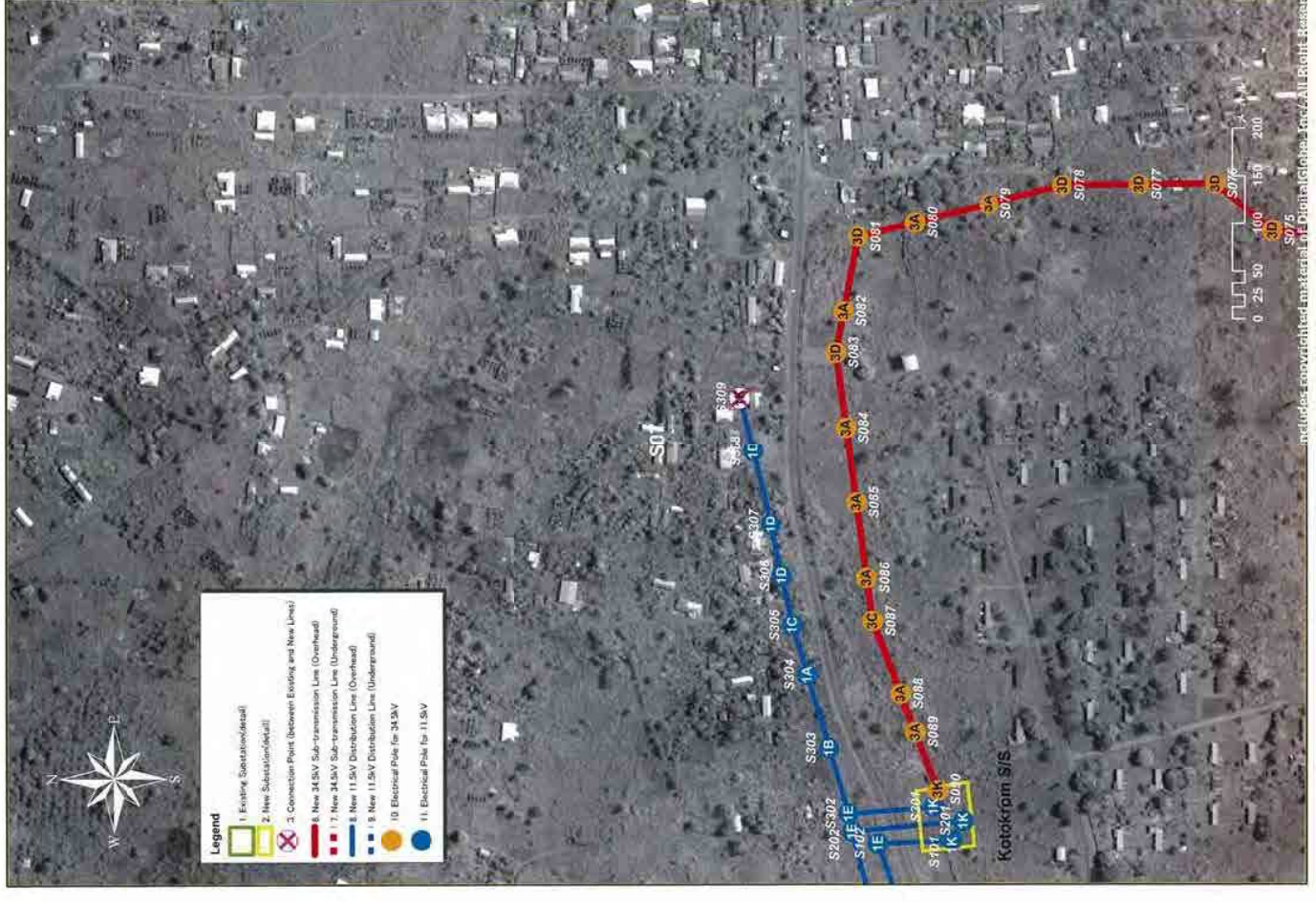


Route Map of Sunyani Distribution System





Route Map of Sunyani Distribution System



Route Map of Sunyani Distribution System



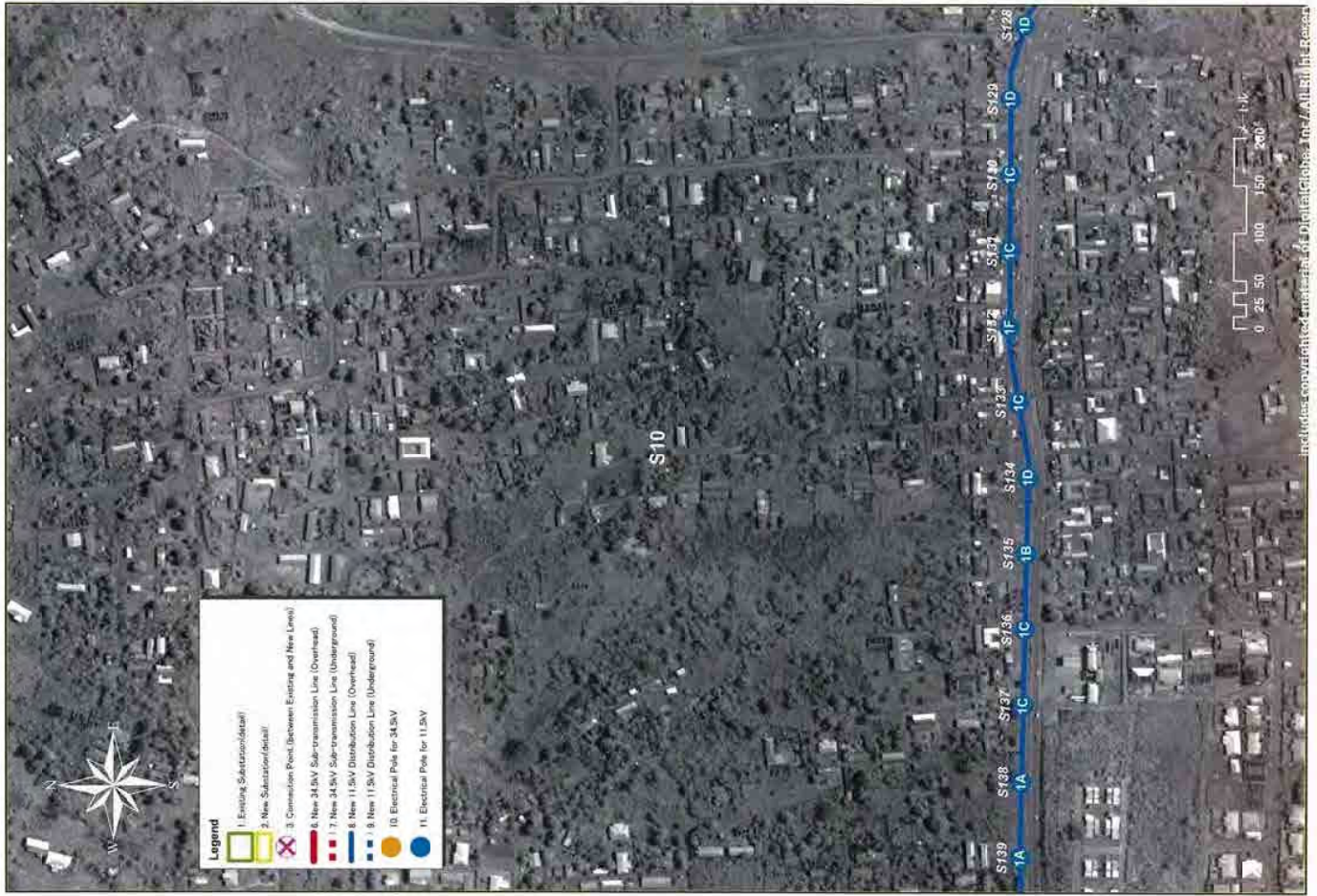
Route Map of Sunyani Distribution System

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Route Map of Sunyani Distribution System

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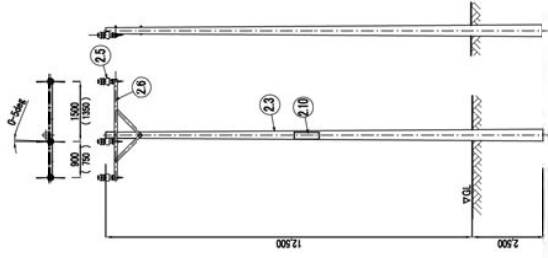
Route Map of Sunyani Distribution System



Route Map of Sunyani Distribution System

DRAWINGS

PART 3 Pole Assembly Drawing for Distribution Line

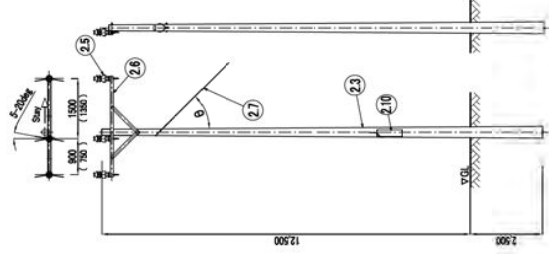


Values in () are for 11.5kV

| P/NO | DESCRIPTION | QTY |
|------|-------------------------------|-----|
| 1.1 | Distribution Transformer (DT) | 0 |
| 1.2 | Auto Recloser | 0 |
| 1.3 | Load Isolator | 0 |
| 1.4 | Cutout Switch with Fuse | 0 |
| 1.5 | Lightning Arrester | 0 |
| 1.6 | Main Distribution Board(MDB) | 0 |
| 2.1 | Conductor (m) | 0 |
| 2.2 | Connector | 0 |
| 2.3 | Steel Pole (15m) | 1 |
| 2.4 | Stram Insulator Set | 0 |
| 2.5 | Pin Insulator set | 3 |
| 2.6 | Grossarm set | 1 |
| 2.7 | Stay Wire Set | 0 |
| 2.8 | Earth Wire Set | 0 |
| 2.9 | LV Cabling Materials | 0 |
| 2.10 | Plate set | 1 |

Remarks : Pole Type "1A" is for 11.5kV and then type 3A is for 34.5kV.
 11.5/34.5kV 引渡し柱 (0度~5度) [型番 1A/3A]
 11.5/34.5kV Intermediate Pole (Line Angle 0~5deg.) [Type 1A/3A]

Dwg.No.TPA-A



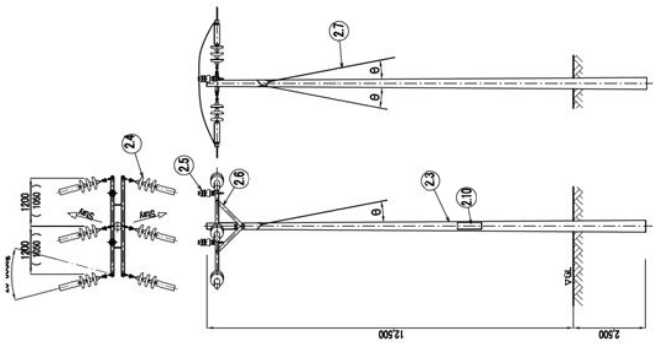
Values in () are for 11.5kV

| P/NO | DESCRIPTION | QTY |
|------|-------------------------------|-----|
| 1.1 | Distribution Transformer (DT) | 0 |
| 1.2 | Auto Recloser | 0 |
| 1.3 | Load Isolator | 0 |
| 1.4 | Cutout Switch with Fuse | 0 |
| 1.5 | Lightning Arrester | 0 |
| 1.6 | Main Distribution Board(MDB) | 0 |
| 2.1 | Conductor (m) | 0 |
| 2.2 | Connector | 0 |
| 2.3 | Steel Pole (15m) | 1 |
| 2.4 | Stram Insulator Set | 0 |
| 2.5 | Pin Insulator set | 3 |
| 2.6 | Grossarm set | 1 |
| 2.7 | Stay Wire Set | 1 |
| 2.8 | Earth Wire Set | 0 |
| 2.9 | LV Cabling Materials | 0 |
| 2.10 | Plate set | 1 |

Preferable Stay Angle : 30° ≦ θ ≦ 45°

11.5/34.5kV 軽荷重柱 (5度~20度) [型番 1B/3B]
 11.5/34.5kV Light Pole (Line Angle 5~20deg.) [Type 1B/3B]

Dwg.No.TPA-B



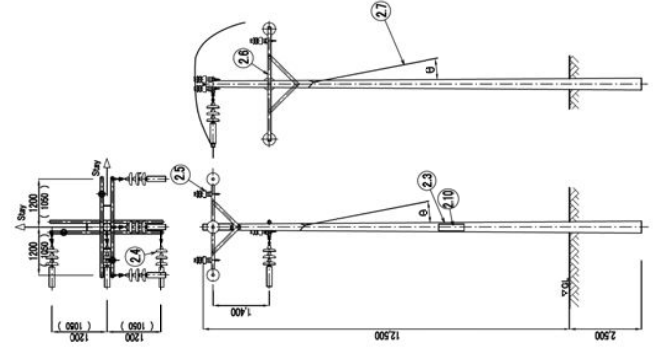
Values in () are for 11.5kV

Dwg.No.TPA-C

11.5/34.5kV 中角支柱(20度~60度)型番 1C/3C
11.5/34.5kV Medium Angle Pole (Line Angle 20-60deg.)Type 1C/3C

Preferable Stay Angle : $30^\circ \leq \theta \leq 45^\circ$

| P/NO | DESCRIPTION | QTY |
|------|-------------------------------|-----|
| 1.1 | Distribution Transformer (DT) | 0 |
| 1.2 | Auto Recloser | 0 |
| 1.3 | Load Isolator | 0 |
| 1.4 | Circuit Switch with Fuse | 0 |
| 1.5 | Lightning Arrester | 0 |
| 1.6 | Main Distribution Board(MDB) | 0 |
| 2.1 | Conductor (m) | 0 |
| 2.2 | Connector | 0 |
| 2.3 | Steel Pole (15m) | 1 |
| 2.4 | Stram Insulator Set | 6 |
| 2.5 | Pin Insulator set | 2 |
| 2.6 | Crossarm set | 2 |
| 2.7 | Stay Wire Set | 2 |
| 2.8 | Earth Wire Set | 0 |
| 2.9 | LV Cabling Materials | 0 |
| 2.10 | Plate set | 1 |



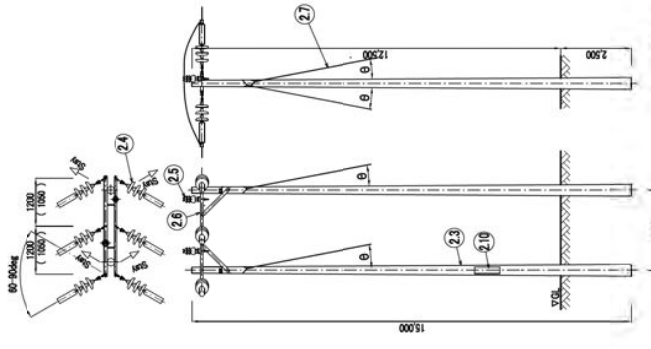
Values in () are for 11.5kV

Dwg.No.TPA-E

11.5/34.5kV 直交柱(90度)型番 1E/3E
11.5/34.5kV Cross Pole (Line Angle 90deg.)Type 1E/3E

Preferable Stay Angle : $30^\circ \leq \theta \leq 45^\circ$

| P/NO | DESCRIPTION | QTY |
|------|-------------------------------|-----|
| 1.1 | Distribution Transformer (DT) | 0 |
| 1.2 | Auto Recloser | 0 |
| 1.3 | Load Isolator | 0 |
| 1.4 | Circuit Switch with Fuse | 0 |
| 1.5 | Lightning Arrester | 0 |
| 1.6 | Main Distribution Board(MDB) | 0 |
| 2.1 | Conductor (m) | 0 |
| 2.2 | Connector | 0 |
| 2.3 | Steel Pole (15m) | 1 |
| 2.4 | Stram Insulator Set | 6 |
| 2.5 | Pin Insulator set | 3 |
| 2.6 | Crossarm set | 4 |
| 2.7 | Stay Wire Set | 2 |
| 2.8 | Earth Wire Set | 0 |
| 2.9 | LV Cabling Materials | 0 |
| 2.10 | Plate set | 1 |



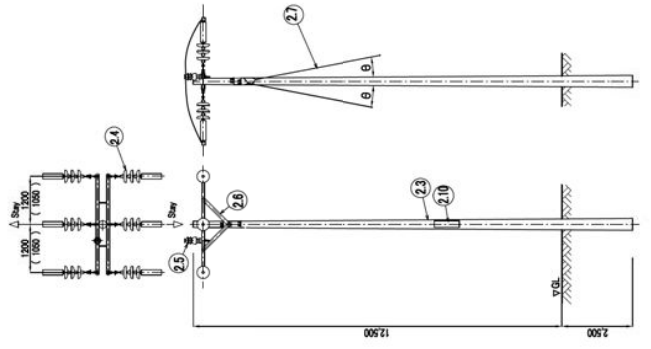
Values in () are for 11.5kV

Dwg.No.TPA-D

11.5/34.5kV 強角支柱(60度~90度未満)型番 1D/3D
11.5/34.5kV Heavy Angle Pole (Line Angle 60-90deg.)Type 1D/3D

Preferable Stay Angle : $30^\circ \leq \theta \leq 45^\circ$

| P/NO | DESCRIPTION | QTY |
|------|-------------------------------|-----|
| 1.1 | Distribution Transformer (DT) | 0 |
| 1.2 | Auto Recloser | 0 |
| 1.3 | Load Isolator | 0 |
| 1.4 | Circuit Switch with Fuse | 0 |
| 1.5 | Lightning Arrester | 0 |
| 1.6 | Main Distribution Board(MDB) | 0 |
| 2.1 | Conductor (m) | 0 |
| 2.2 | Connector | 0 |
| 2.3 | Steel Pole (15m) | 2 |
| 2.4 | Stram Insulator Set | 6 |
| 2.5 | Pin Insulator set | 2 |
| 2.6 | Crossarm set | 2 |
| 2.7 | Stay Wire Set | 4 |
| 2.8 | Earth Wire Set | 0 |
| 2.9 | LV Cabling Materials | 0 |
| 2.10 | Plate set | 1 |



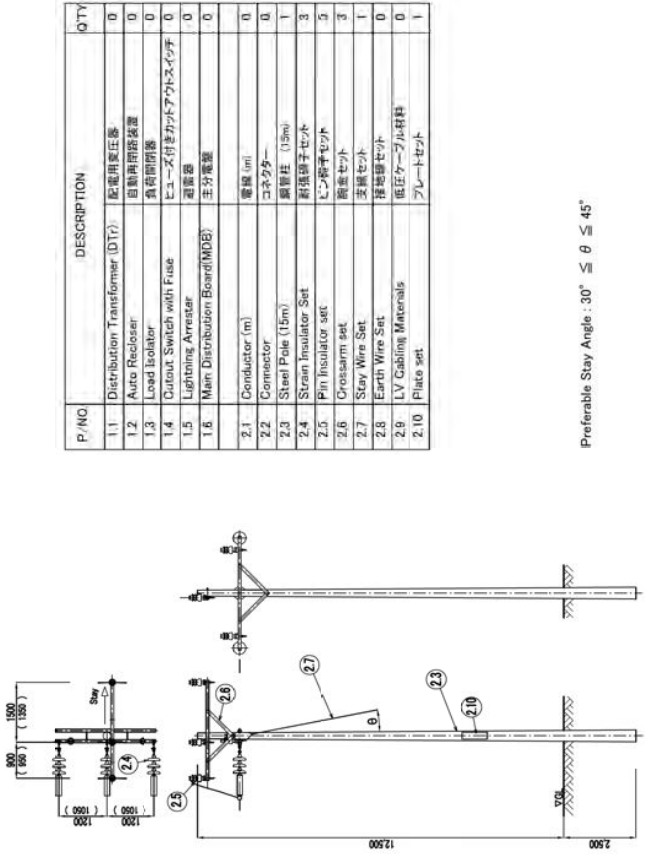
Values in () are for 11.5kV

Dwg.No.TPA-F

11.5/34.5kV 面引留め柱型番 1F/3F
11.5/34.5kV Section Pole Type 1F/3F

Preferable Stay Angle : $30^\circ \leq \theta \leq 45^\circ$

| P/NO | DESCRIPTION | QTY |
|------|-------------------------------|-----|
| 1.1 | Distribution Transformer (DT) | 0 |
| 1.2 | Auto Recloser | 0 |
| 1.3 | Load Isolator | 0 |
| 1.4 | Circuit Switch with Fuse | 0 |
| 1.5 | Lightning Arrester | 0 |
| 1.6 | Main Distribution Board(MDB) | 0 |
| 2.1 | Conductor (m) | 0 |
| 2.2 | Connector | 0 |
| 2.3 | Steel Pole (15m) | 1 |
| 2.4 | Stram Insulator Set | 6 |
| 2.5 | Pin Insulator set | 1 |
| 2.6 | Crossarm set | 2 |
| 2.7 | Stay Wire Set | 2 |
| 2.8 | Earth Wire Set | 0 |
| 2.9 | LV Cabling Materials | 0 |
| 2.10 | Plate set | 1 |



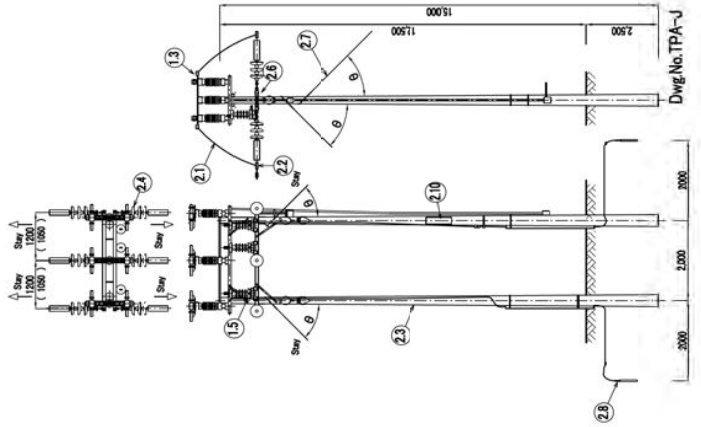
Dwg.No.TPA-G

Values in () are for 11.5kV

Preferable Stay Angle : $30^\circ \leq \theta \leq 45^\circ$

11.5/34.5kV 分岐柱[型番 1G/3G]
11.5/34.5kV T-off Pole[Type 1G/3G]

| P/NO | DESCRIPTION | QTY |
|------|-------------------------------|-----|
| 1.1 | Distribution Transformer (DT) | 0 |
| 1.2 | Auto Recloser | 0 |
| 1.3 | Load Isolator | 0 |
| 1.4 | Outcut Switch with Fuse | 0 |
| 1.5 | Lightning Arrester | 0 |
| 1.6 | Main Distribution Board(MDB) | 0 |
| 2.1 | Conductor (m) | 0 |
| 2.2 | Connector | 0 |
| 2.3 | Steel Pole (15m) | 1 |
| 2.4 | Strain Insulator Set | 3 |
| 2.5 | Pin Insulator set | 5 |
| 2.6 | Crossarm set | 3 |
| 2.7 | Stay Wire Set | 1 |
| 2.8 | Earth Wire Set | 0 |
| 2.9 | LV Cabling Materials | 0 |
| 2.10 | Plate set | 1 |

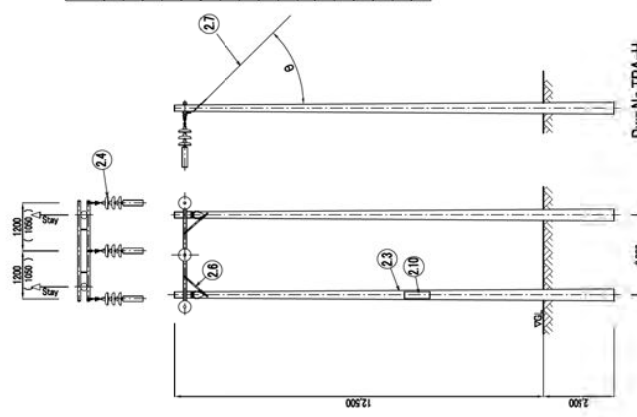


Dwg.No.TPA-J

Values in () are for 11.5kV

11.5/34.5kV 断路器柱(水平型)[型番 1J/3J]
11.5/34.5kV Disconnecting Switch Pole (Horizontal Type)[Type 1J/3J]

| P/NO | DESCRIPTION | QTY |
|------|--|-----|
| 1.1 | Distribution Transformer (DT) | 0 |
| 1.2 | Auto Recloser | 0 |
| 1.3 | Disconnecting Switch with Operating Device | 1 |
| 1.4 | Outcut Switch with Fuse | 0 |
| 1.5 | Lightning Arrester | 1 |
| 1.6 | Main Distribution Board(MDB) | 0 |
| 2.1 | Conductor (m) | 30 |
| 2.2 | Connector | 3 |
| 2.3 | Steel Pole (15m) | 2 |
| 2.4 | Strain Insulator Set | 6 |
| 2.5 | Pin Insulator set | 0 |
| 2.6 | Crossarm set | 2 |
| 2.7 | Stay Wire Set | 4 |
| 2.8 | Earth Wire Set | 3 |
| 2.9 | LV Cabling Materials | 0 |
| 2.10 | Plate set | 1 |



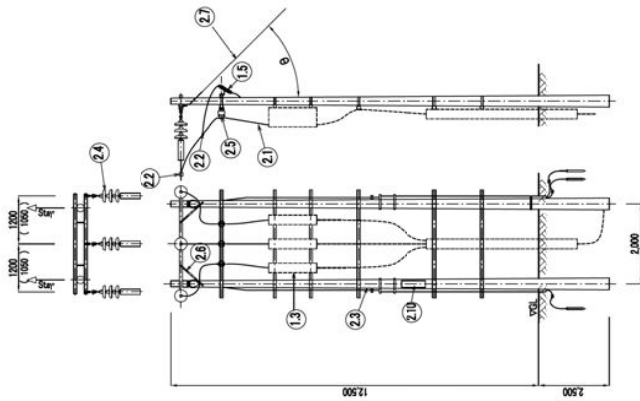
Dwg.No.TPA-H

Values in () are for 11.5kV

Preferable Stay Angle : $30^\circ \leq \theta \leq 45^\circ$

11.5/34.5kV 終端柱[型番 1H/3H]
11.5/34.5kV Terminal Pole[Type 1H/3H]

| P/NO | DESCRIPTION | QTY |
|------|-------------------------------|-----|
| 1.1 | Distribution Transformer (DT) | 0 |
| 1.2 | Auto Recloser | 0 |
| 1.3 | Load Isolator | 0 |
| 1.4 | Outcut Switch with Fuse | 0 |
| 1.5 | Lightning Arrester | 0 |
| 1.6 | Main Distribution Board(MDB) | 0 |
| 2.1 | Conductor (m) | 0 |
| 2.2 | Connector | 0 |
| 2.3 | Steel Pole (15m) | 2 |
| 2.4 | Strain Insulator Set | 3 |
| 2.5 | Pin Insulator set | 0 |
| 2.6 | Crossarm set | 2 |
| 2.7 | Stay Wire Set | 2 |
| 2.8 | Earth Wire Set | 0 |
| 2.9 | LV Cabling Materials | 0 |
| 2.10 | Plate set | 1 |

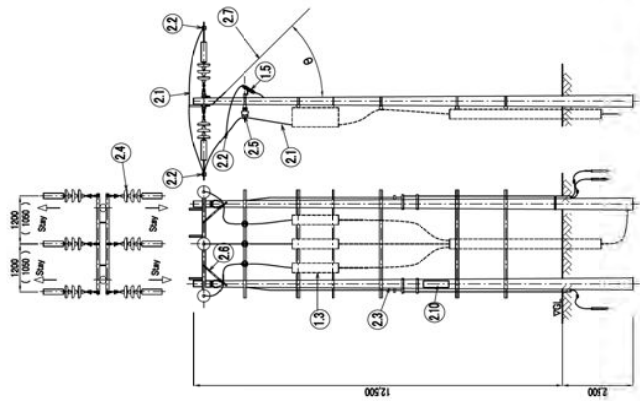


Dwg.No.TPA-K

11.5/34.5kV 断路器柱(垂直引留型) [型番 1K/3K]
11.5/34.5kV Disconnecting Switch Pole(Vertical Dead End Type) [Type 1K/3K]

Values in () are for 11.5kV

Preferable Stay Angle : $30^\circ \leq \theta \leq 45^\circ$

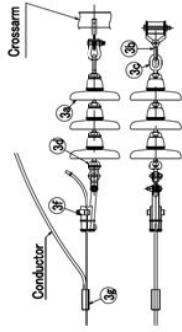


Dwg.No.TPA-M

11.5/34.5kV 断路器柱(垂直引留型) [型番 1M/3M]
11.5/34.5kV Disconnecting Switch Pole(Vertical Section Type) [Type 1M/3M]

Values in () are for 11.5kV

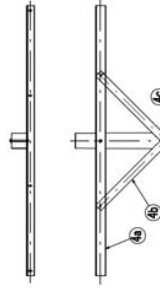
Preferable Stay Angle : $30^\circ \leq \theta \leq 45^\circ$



Strain Insulator Set

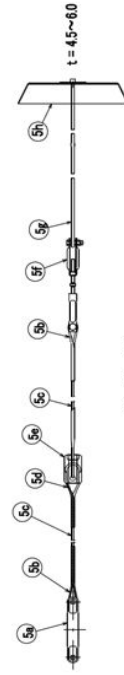
| No. | Description | QTY per set |
|-----|-----------------------|-------------|
| 3a | Disc Insulator | 3(2) |
| 3b | Anchor Shackle | 1 |
| 3c | Ball Eye | 1 |
| 3d | Socket Eye | 1 |
| 3f | Dead End Clamp | 1 |
| 3g | Compression Connector | 1 |

Values in () are for 11.5kV



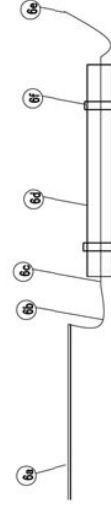
Crossarm Set

| No. | Description | QTY per set |
|-----|----------------|-------------|
| 4a | Crossarm | 1 |
| 4b | Crossarm Brace | 2 |
| 4c | Bolt&Nut Set | 4 |



Stay Wire Set

| No. | Description | QTY per set | No. | Description | QTY per set |
|-----|-----------------------------|-------------|-----|------------------------------|-------------|
| 5a | Stay Band | 1 | 5e | 34.5kV(11.5kV)Stay Insulator | 1 |
| 5b | Dead End Grip for Thimble | 2 | 5f | Turnduckle | 1 |
| 5c | Stay Wire | 1 | 5g | Stay Rod | 1 |
| 5d | Dead End Grip for Insulator | 2 | 5h | Stay Anchor | 1 |



Earthing Wire Set

| No. | Description | QTY per set | No. | Description | QTY per set |
|-----|-------------------|-------------|-----|--------------|-------------|
| 6a | Grounding Rod | 2 | 6e | Terminal Lug | 1 |
| 6b | Earthing Terminal | 1 | 6f | Band | 1 |
| 6c | IV Wire (35sqmm) | 12m | | | |
| 6d | PVC (1inch) | 23m | | | |

Dwg.No.TPA-Z

構成部品組付図
Material Composition of Assembly Parts