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MERALCO Standards:
Electrical Design

Engr. Eduard Mercado
Electrical Design Team

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Electrical Design Standards

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SERVICE VOLTAGES

- SECONDARY METERED - 240 V, 400 V, 460 V
- PRIMARY METERING -34.5 kV, 13.8 kV (portions of Cavite & Bulacan), 115 kV (Subtransmission)

FACILITIES

1. OVERHEAD
   - POLE MOUNTED TRANSFORMERS
   - PADMOUNT TRANSFORMERS
   - VAULT TYPE DT

2. UNDERGROUND
   - PADMOUNT TRANSFORMERS
   - VAULT TYPE DT

Single Line Diagram

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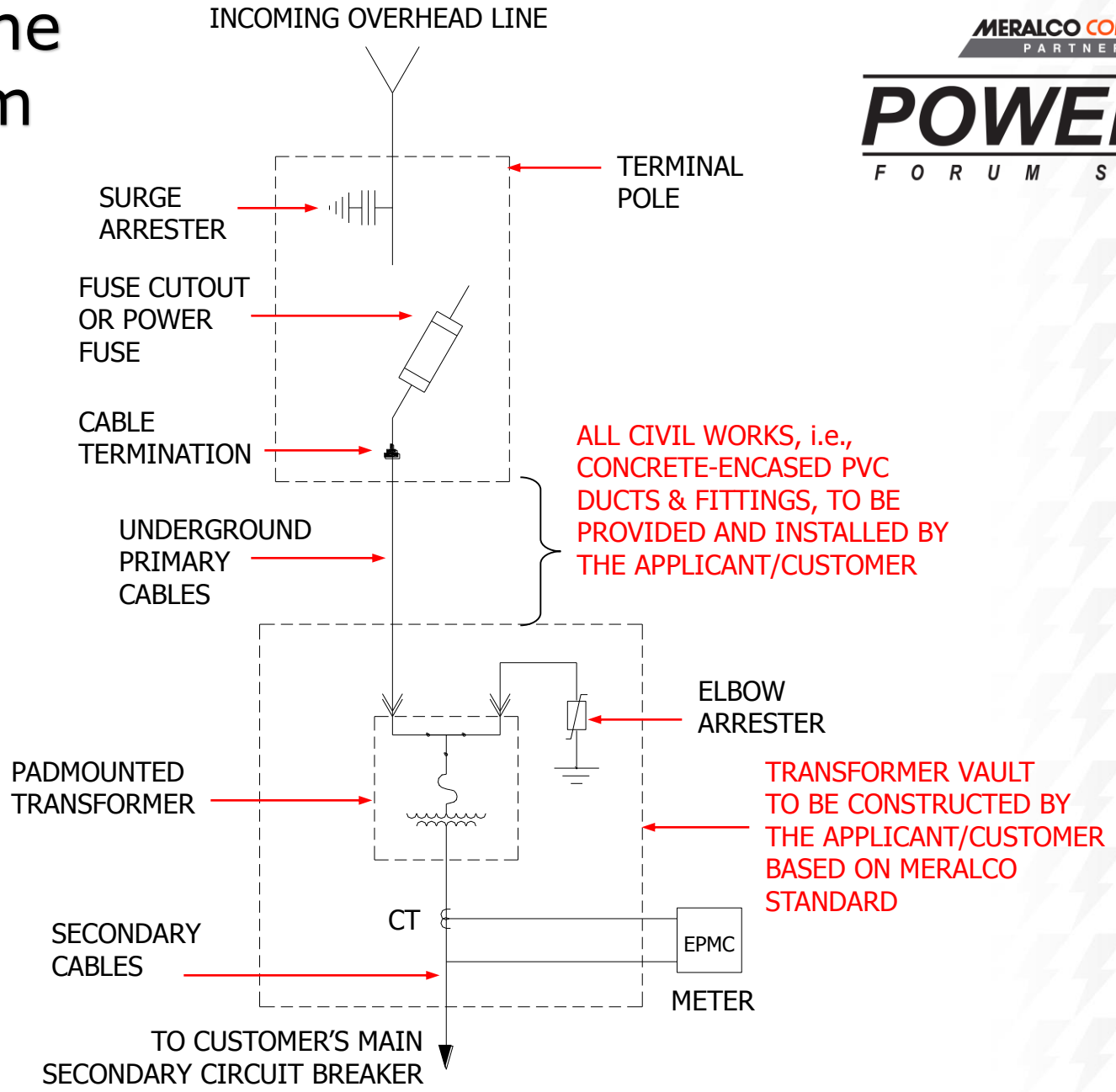

OVERHEAD LINE FEEDING A TRANSFORMER VAULT

Single Line Diagram

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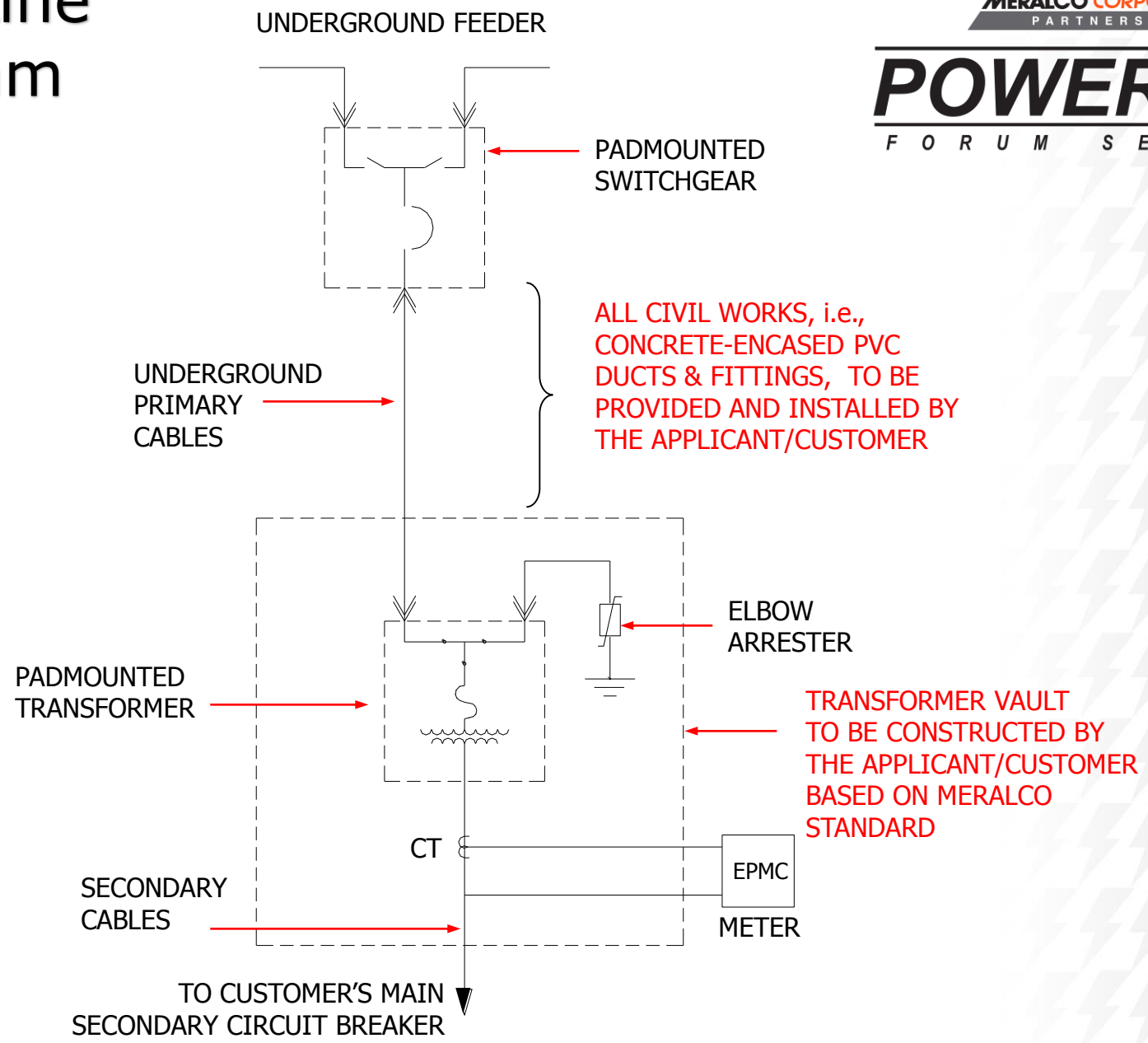

UNDERGROUND LINE FEEDING A TRANSFORMER VAULT

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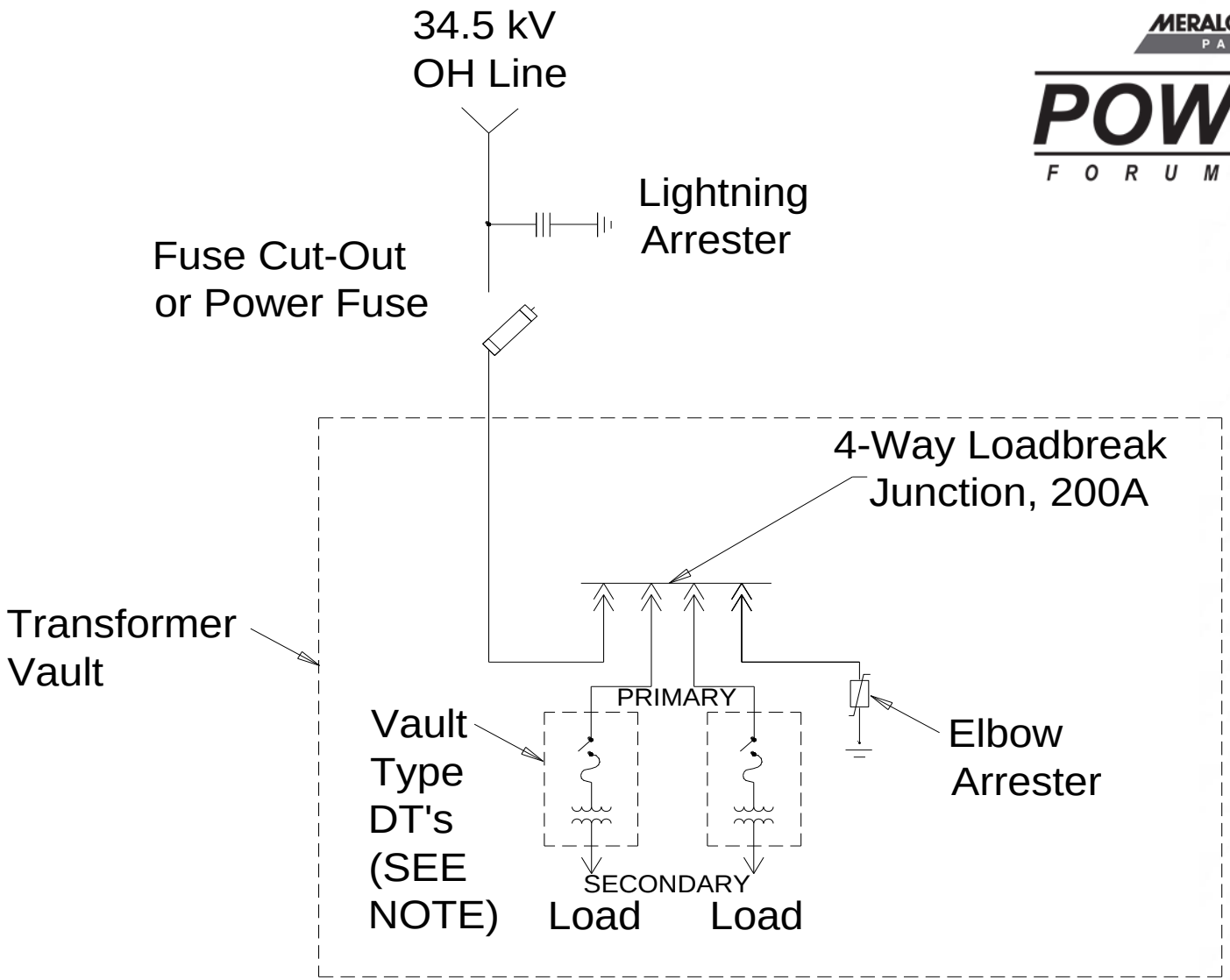
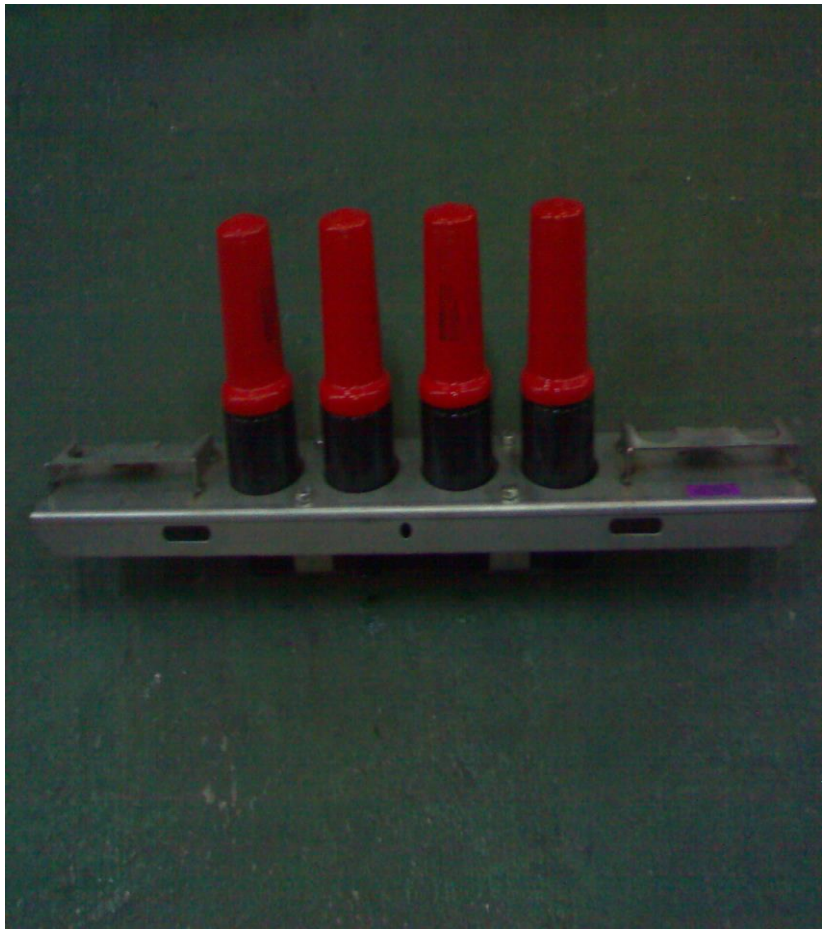


Single Line Diagram - 2 Banks w/ 4-Way Junction



4-WAY / 4-POINT JUNCTION

Transformers for Vault Installation

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Meralco-Supplied Padmounted Transformers

- Three-phase,
  34.5 GrdY/20 kV or
  13.2 GrdY/7.62 kV

- Available in either
  240Y/139-V secondary
  (75-1000 kVA) or
  480Y/277-V secondary
  (500-2000 kVA)
- 416Y/240 V secondary
  (500-1000 kVA)

Transformers for Vault Installation

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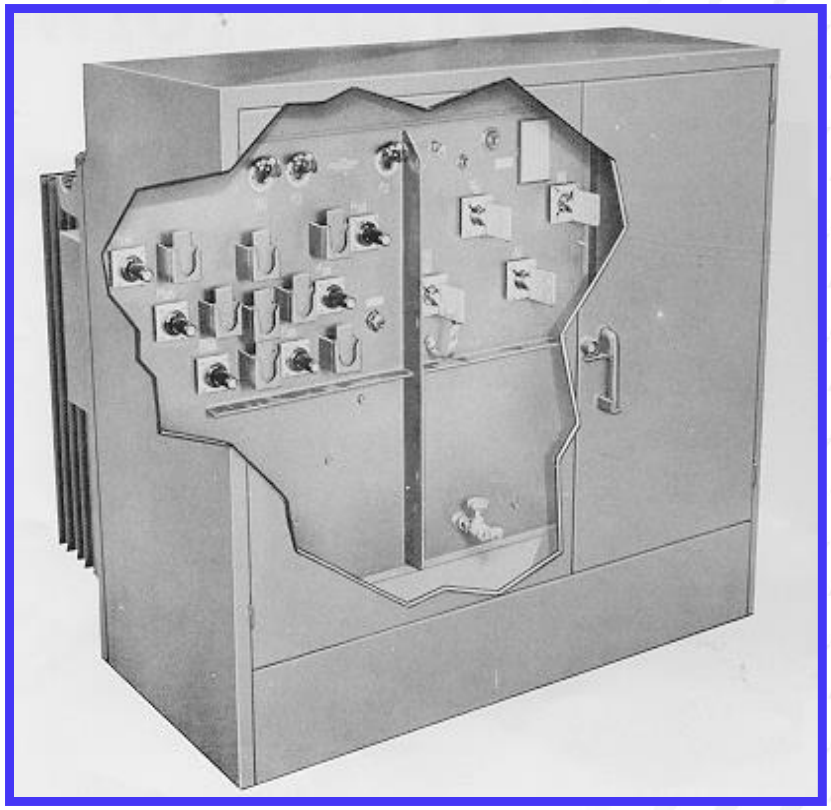
Meralco-Supplied Padmounted Transformers

- Deadfront primary
- Less flammable liquid filled
- Completely self-protected with fuses
- Provided with loop sectionalizing switch



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Transformers for Vault Installation

Meralco-Supplied Deadfront Distribution Transformer

- Single-phase,
  34.5 GrdY/20 kV or
  13.2 GrdY/7.62 kV
- Available in either
  139/277-V secondary or
  240/120-V secondary
- Available in 167 – 333 kVA

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Transformers for Vault Installation

Meralco-Supplied Deadfront Distribution Transformer

- Deadfront primary
- Round tank construction
- Less flammable liquid filled
- Provided with standard DT accessories

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Standard Vault

Location

PREFERRED VAULT LOCATION:

- PREFERRED VAULT LOCATION SHALL BE ON THE GROUND FLOOR
- SECOND FLOOR MAY BE ALLOWED (FOR VAULT TYPE DT's AND PADMOUNTED XF WITH HOISTING FACILITIES)
- FIRST BASEMENT MAY BE ALLOWED FOR BUILDINGS WITH MULTIPLE BASEMENT

PREFERRED VAULT LOCATION:

- THE VAULT SHALL BE LOCATED ON PERIMETER OF THE BUILDING
- ADJACENT TO STREET/ROADWAY ACCESSIBLE TO MERALCO TRUCKS AND CRANE TRUCK

MINIMUM ROAD WIDTH : 6.5 METERS

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Standard Vault Specifications/Requirements

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STANDARD SPECIFICATION/ REQUIREMENTS:

- WALLS AND ROOF SHALL BE MADE OF REINFORCED CONCRETE NOT LESS THAN 150MM
- THERE SHALL BE NO OPENING FROM THE VAULT TO ANY PART OF THE BUILDING INTERIOR
- 150 MM DOORSILL IS REQUIRED FOR LIQUID CONFINEMENT
- PROVISION FOR ADEQUATE AND PERMANENT VENTILATION (EXHAUST FAN-TEMP CONTROLLED RATED ¾ HP, 71 CuM/Min (2500 CFM))
- CLEAR HEADROOM SHALL NOT BE LESS THAN 4M FROM THE BOTTOM OF THE I-BEAM TO MAINTAIN A 30° SLING ANGLE FROM THE VERTICAL (HOISTING FACILITY)

STANDARD SPECIFICATION/ REQUIREMENTS:

- DUCTS (PRIMARY AND SECONDARY) – 110 MM DIAMETER, THICK WALLED, RED ORANGE COLOR, UNPLASTICIZED POLYVINYL CHLORIDE (UPVC) IN ACCORDANCE WITH PNS 14. IT SHOULD BE ENCASED IN CONCRETE

- PROVISION OF PERSONNEL ACCESS DOORWAY DIRECTLY ACCESSIBLE FROM OUTSIDE OF THE BUILDING

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Customer Vault Layouts for Transformers (pdt & vt)

Requirements for Customer Vault

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MINIMUM DIMENSION

PADMOUNT TRANSFORMER IN VAULT

LOCATION	1-BANK	2-BANKS
Ground Floor	(W) 5m X (D) 4m X (H) 3m	(W) 8m X (D) 4m X (H) 3m
2nd Floor	(W) 5m X (D) 6m X (H) 4m*	(W) 8m X (D) 6m X (H) 4m*
1st Basement	(W) 5m X (D) 6m X (H) 3m	(W) 8m X (D) 6m X (H) 3m

NOTES: [1] W = Width; D = Depth; H = Height (Headroom)

*[2] 4m vertical distance measured from the bottom of the I-beam to the floor is required when hoisting the transformer

EXCEPTION: For 2nd floor transformer vault with a hatchway, the depth requirement is 8m.

Requirements for Customer Vault

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MINIMUM DIMENSION

DEADFRONT (VAULT TYPE) DISTRIBUTION TRANSFORMERS

LOCATION	1-BANK	2-BANKS
Ground Floor	(W) 5m X (D) 4m x (H) 3m	(W) 6m X (D) 6m X (H) 3m
2nd Floor	(W) 5m X (D) 4m x (H) 3m	(W) 6m X (D) 6m X (H) 3m
1st Basement	(W) 5m X (D) 4m x (H) 3m	(W) 6m X (D) 6m X (H) 3m

NOTE: W = Width; D = Depth; H = Height (Headroom)

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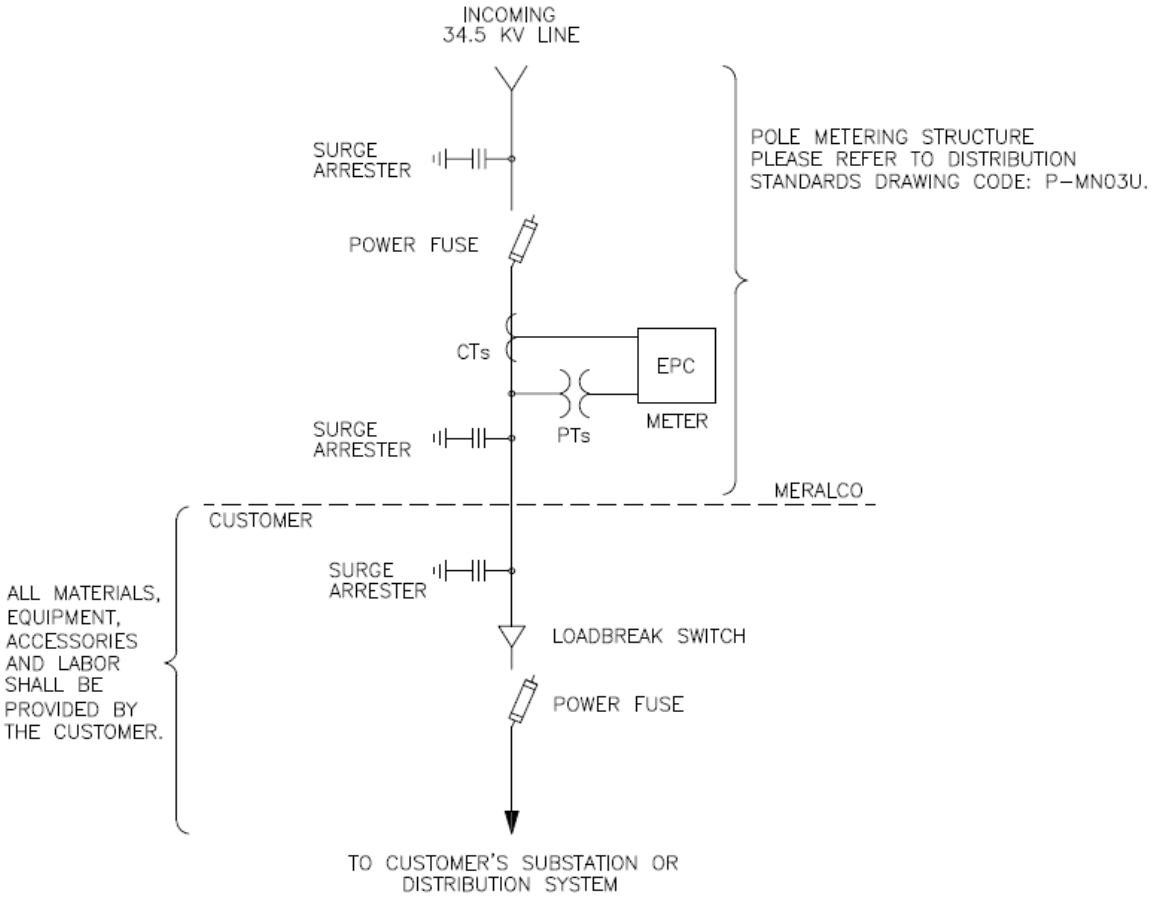
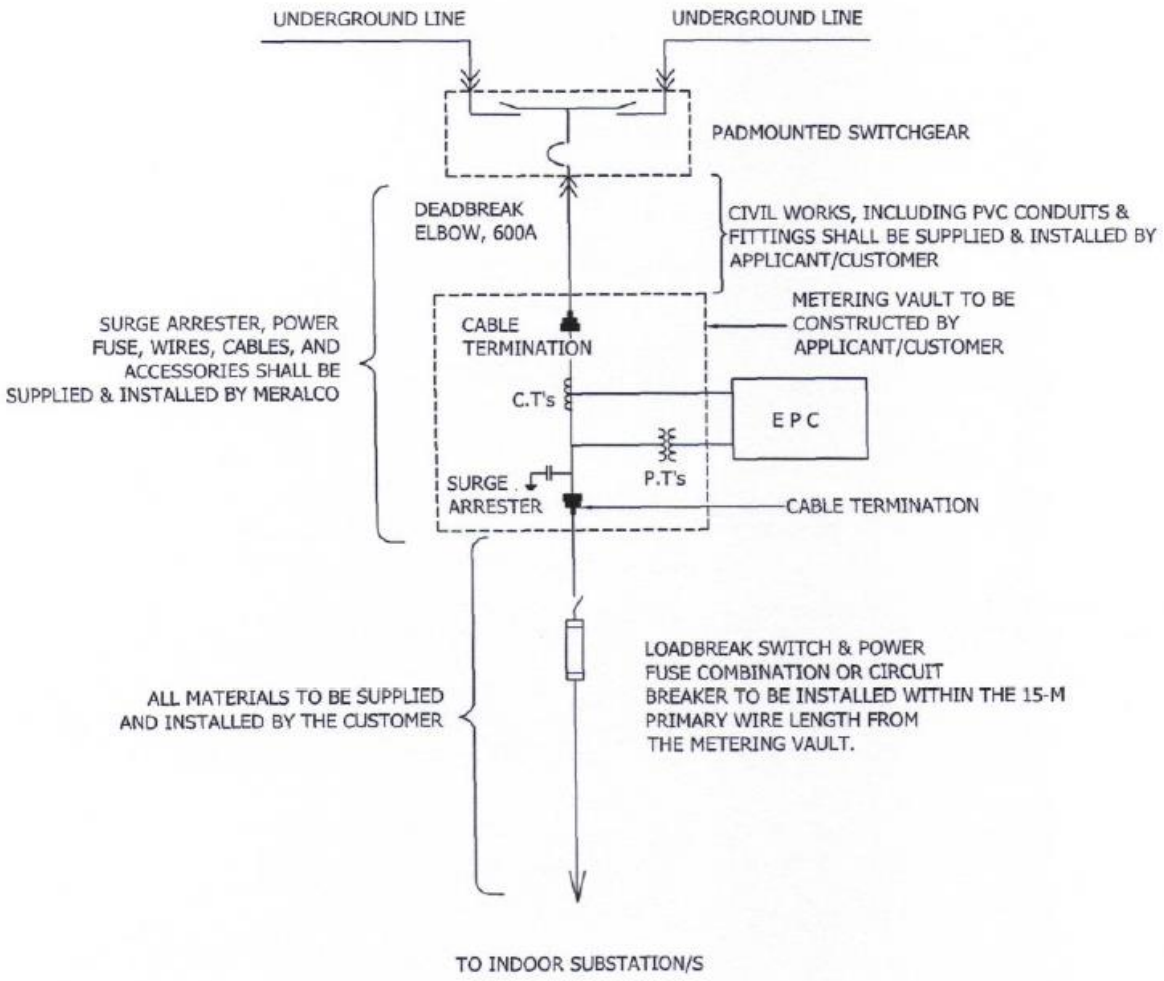
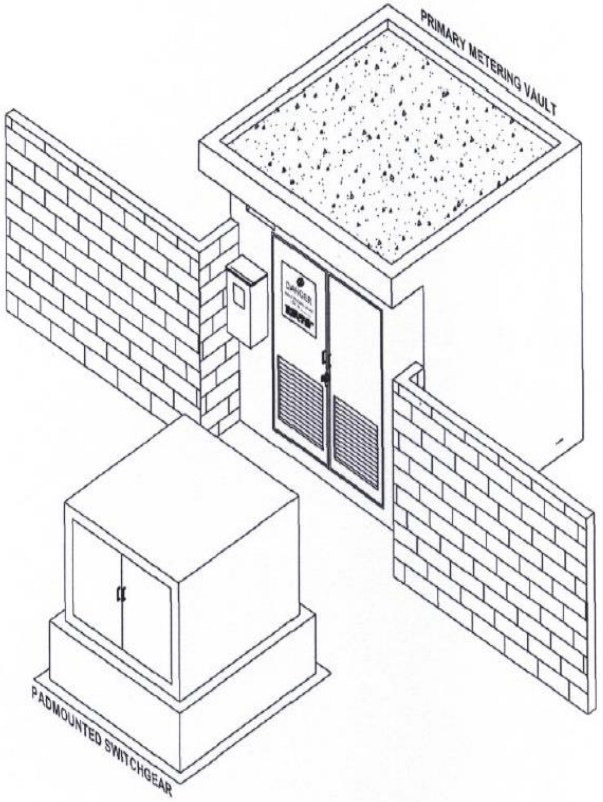
PRIMARY METERING



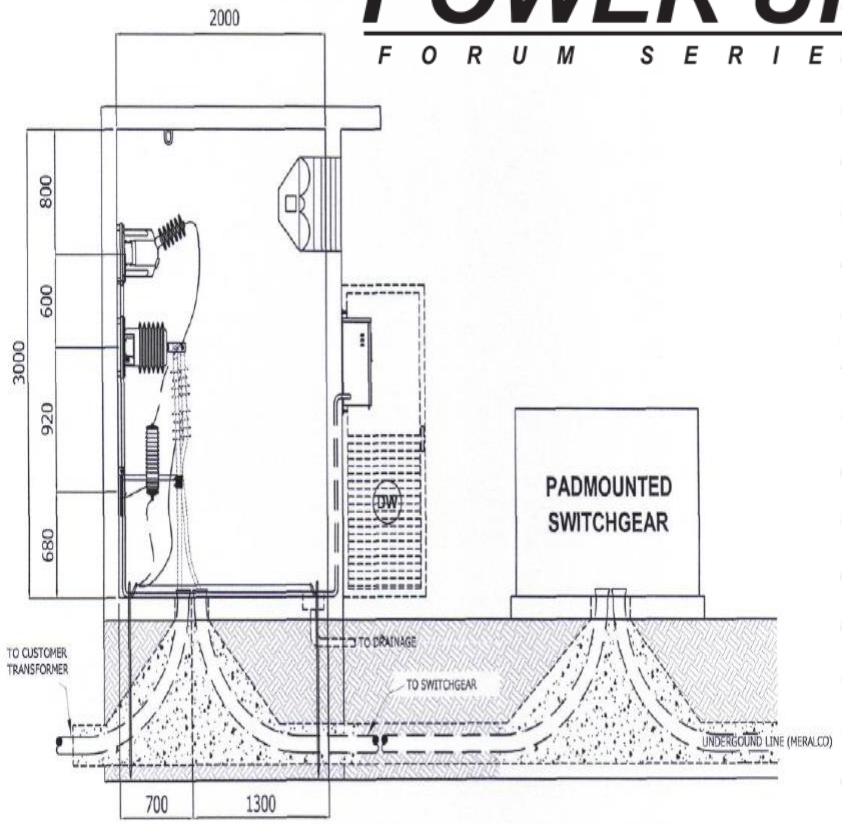
SINGLE LINE DIAGRAM FOR PRIMARY METERING (OH)



SINGLE LINE DIAGRAM FOR PRIMARY METERING (UG)



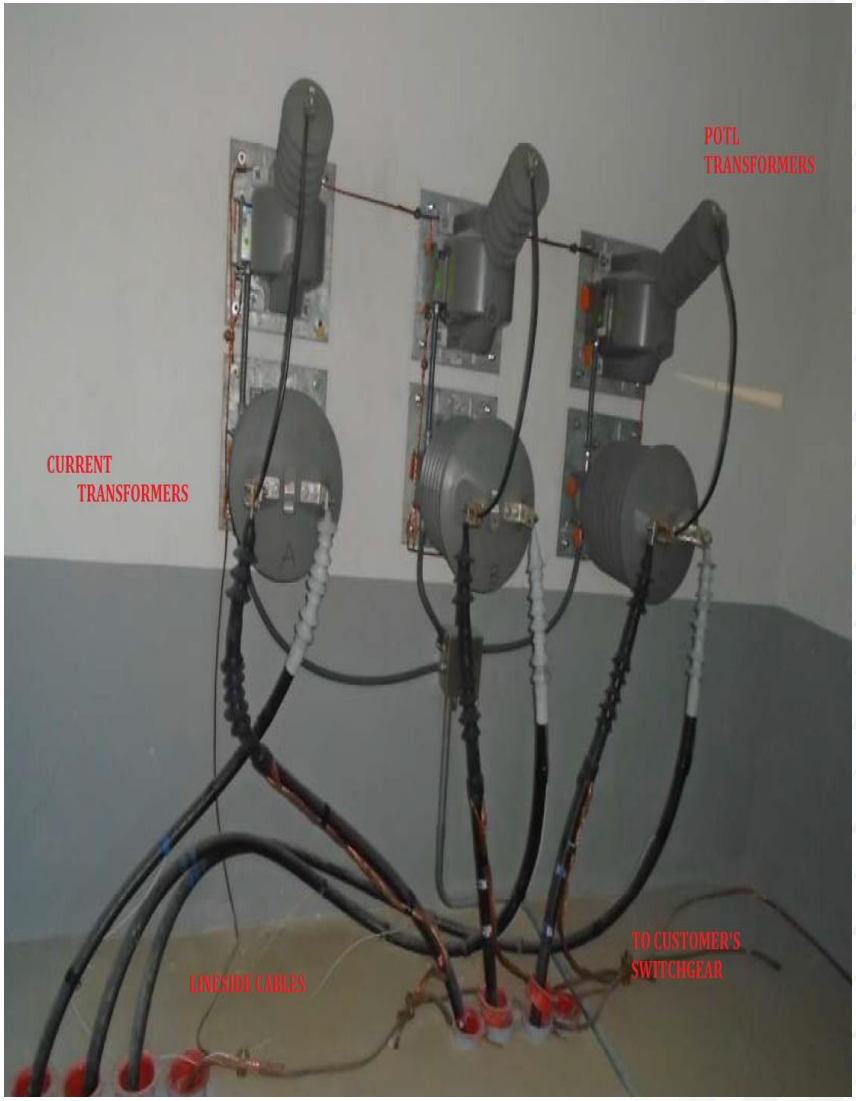
TYPICAL PRIMARY METERING VAULT AT GROUND FLOOR
PERSPECTIVE VIEW



TYPICAL PRIMARY METERING VAULT AT GROUND FLOOR
ELEVATION

TYPICAL PRIMARY METERING ARRANGEMENT


PRIMARY METERING ROOM
PADMOUNT SWITCHGEAR
to PRIMARY MANHOLE


POTL
TRANSFORMERS
CURRENT
TRANSFORMERS
LINESIDE CABLES
TO CUSTOMER'S
SWITCHGEAR

3 Way RMU with Metering Module

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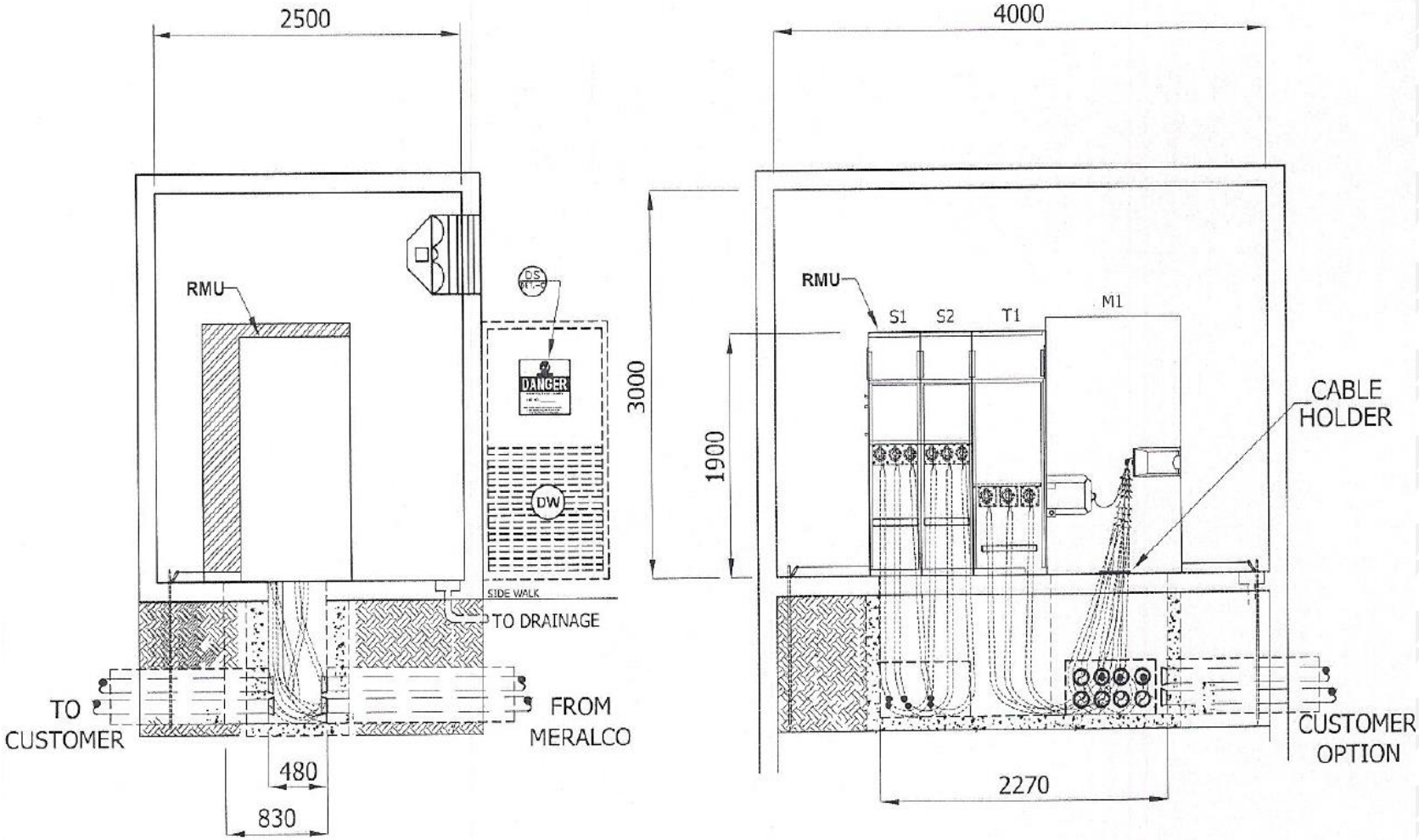

3 Way RMU with Metering Module

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Thank you.