

Date: 26th May, 2016

Our Ref.: PLS8/1/SW

To:

(Refer Attached Mailing Distribution List)

ENGINEERING CIRCULAR NO. 4/2016

Outdoor Low Voltage (LV) Current Transformer Meter Cubicle

This Engineering Circular (EC) applies to Main Switchboard (MSB) with connected load not less than 400A and not exceeding 2000A with CT metering and located at ground or basement level.

This EC replaces and supersedes the following:

- i. EC No. 5/2009 Clause 2.4 on the requirement of HV metering for loading of 500kVA and above;
- ii. EC No. 4/2015 on Introduction of LV Current-Transformer Metering Cubicle in replacement to HV metering

This circular will take effect as follows:

- i. The supply schemes submitted after the effective date are required to comply with the requirement of this EC.
- ii. This EC is not applicable for supply scheme submitted prior to the effective date of the circular.
- iii. The effective date of this EC is 13th June 2016.

.....
(HAJI YUSRI BIN SAFRI)
VICE PRESIDENT
(RETAIL)

Encl.

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1. Introduction

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- ii. EC No. 4/2015 on Introduction of LV Current-Transformer Metering Cubicle in replacement to HV metering

With this EC coming into effect, the followings are to be noted:

- i. HV substation metering or provision of this metering is not required; and
- ii. Metering at MSB or provision of this metering compartment in the MSB is not required.

2. Outdoor LV CT Meter Cubicle

2.1 Meter Cubicle

The standard meter cubicles are as follows:

- i. 400A with dimension 1500mm(H) x 725mm(W) x 450mm(D);
- ii. 800A with dimension 1500mm(H) x 725mm(W) x 450mm(D);
- iii. 2000A with dimension 1 500mm(H) x 850mm(W) x 450mm(D);

The equipment and the accessories installed in the meter cubicle are busbars for incoming and outgoing cables, CTs, test terminal block, wiring and meters. The diagram of the meter cubicle is as shown as follows:-

- i. Appendix A: Standard drawing of 400A outdoor CT meter cubicle;
- ii. Appendix B: Standard drawing of 800A outdoor CT meter cubicle;
- iii. Appendix C: Standard drawing of 2000A outdoor CT meter cubicle;
- iv. Appendix D: Front and side view of meter cubicle.

The typical concrete plinth is as shown in Appendix E. Any variation of the typical concrete plinth or provision of other civil requirements such as trenches, prior to construction, shall be determined and mutually acknowledged through acceptance of drawings by the utility company, submitted by the consultant, contractor, client or customer. In the event of changes made to the meter cubicle location after construction, by either the utility or the consultant/ contractor/ client/ customer, the cost shall be borne by the requesting party.

Minimum clearance shall be maintained from the meter cubicle as follows:-

- i. 300mm from the left side;
- ii. 600mm from the right side; and
- iii. 1200mm from the front.

Where the meter cubicle is located in area near to moving vehicles, a minimum barrier, comprising of two guard posts/ bollards of diameter 100mm shall be installed at 500mm to 600mm from the edges of the meter cubicle as shown in Appendix F. However, such barriers can be omitted if they interfere with area with other purposes such as pedestrian walkways, footpaths, parking lots and others.

2.2 Location of Meter Cubicle

The options for the location of the outdoor meter cubicle can be as follows:-

- i. Option 1 – Immediately outside of the MSB room (refer to Appendix G); or
- ii. Option 2 – At the fence perimeter. This option requires one (1) meter width proper access walkway to be provided by the customer (refer to Appendix H);
or
- iii. Option 3 – Immediately outside on the perimeter of the customer/ Sarawak Energy Berhad (SEB) substation located inside the customer premises. Where the substation is indoor type with the transformer room adjacent to MSB room, cable trench shall be constructed for laying of cables (refer to Appendix I); or

- iv. Option 4 – Located within a recessed wall if necessary to avoid the meter cubicle from protruding and interfering with other purposes of the surrounding area such as pedestrian walkways, footpaths, parking lots and others (refer to Appendix J).

2.3 Earthing Requirement

The meter cubicle shall be earthed with local earth of maximum 5 ohms using 35mm² hard drawn copper conductor as lead wire. The armour or conductor shield of incoming and outgoing cable shall be connected to the earthing bar.

3. Custodian of Materials and Maintenance Responsibility

SEB shall be responsible for maintaining the metering facilities in good working order and shall be responsible for the incoming and outgoing cable from the meter cubicle including the terminations at the customer's MSB. The meter cubicle shall be under the custody of Retail department of SEB.

However, for Option 3 in Appendix I, where the LV system is within the boundary of the premises and mutually agreed in writing to be fully maintained by the customer, SEB will be responsible for the LV CT meter cubicle only. A letter of undertaking (refer sample letter in Appendix L) shall be given by the customer to SEB.

Whenever an electrical equipment or apparatus is erected and/or supply line is laid on State land or public areas, such equipment, apparatus or supply line shall be under the responsibility of the utility licensee.

4. Procurement of Meter Cubicle

The meter cubicle, under the responsibility and maintenance of SEB to be in good working order and condition, is to be procured by SEB only to ensure consistent quality and design throughout SEB supply system.

5. Changes to Design Requirement

Where meter cubicle is required to be installed at location other than at the prescribed location options in this EC due to site specific requirements or needs, such requirements or needs shall be specified clearly.

Where there are changes to the layout or design requirements from the standard practices in this EC, such as but not limited to:-

- i. Meter cubicle at location other than prescribed option in this EC;
- ii. Different access requirement;
- iii. Other supply metering scheme such as HV side metering for LV supply; or
- iv. Barrier other than guard posts or bollard;

the requesting party i.e. SEB or the client/ customer shall bear the cost difference for the changes requested.

6. Applicability

This EC does not apply to customer with High Voltage (HV) scheme.

7. Dispute

Where there are disagreements, such disagreements can be referred to:-

Manager
Maintenance & Operation Standards
Sarawak Energy Berhad

to resolve the matter. In the event that such disagreements could not be resolved, the matter will be referred to:-

Director of Electricity Supply
Electrical Inspectorate Unit
Ministry of Public Utilities Sarawak

8. Endorsement of EC

This circular has been submitted for endorsement by Electrical Inspectorate Unit under the Ministry of Public Utilities of Sarawak.

9. Effective date

This circular will take effect as follows:

- i. The supply schemes submitted after the effective date are required to comply with the requirement of this EC.
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- iii. The effective date of this EC is 13th June 2016.

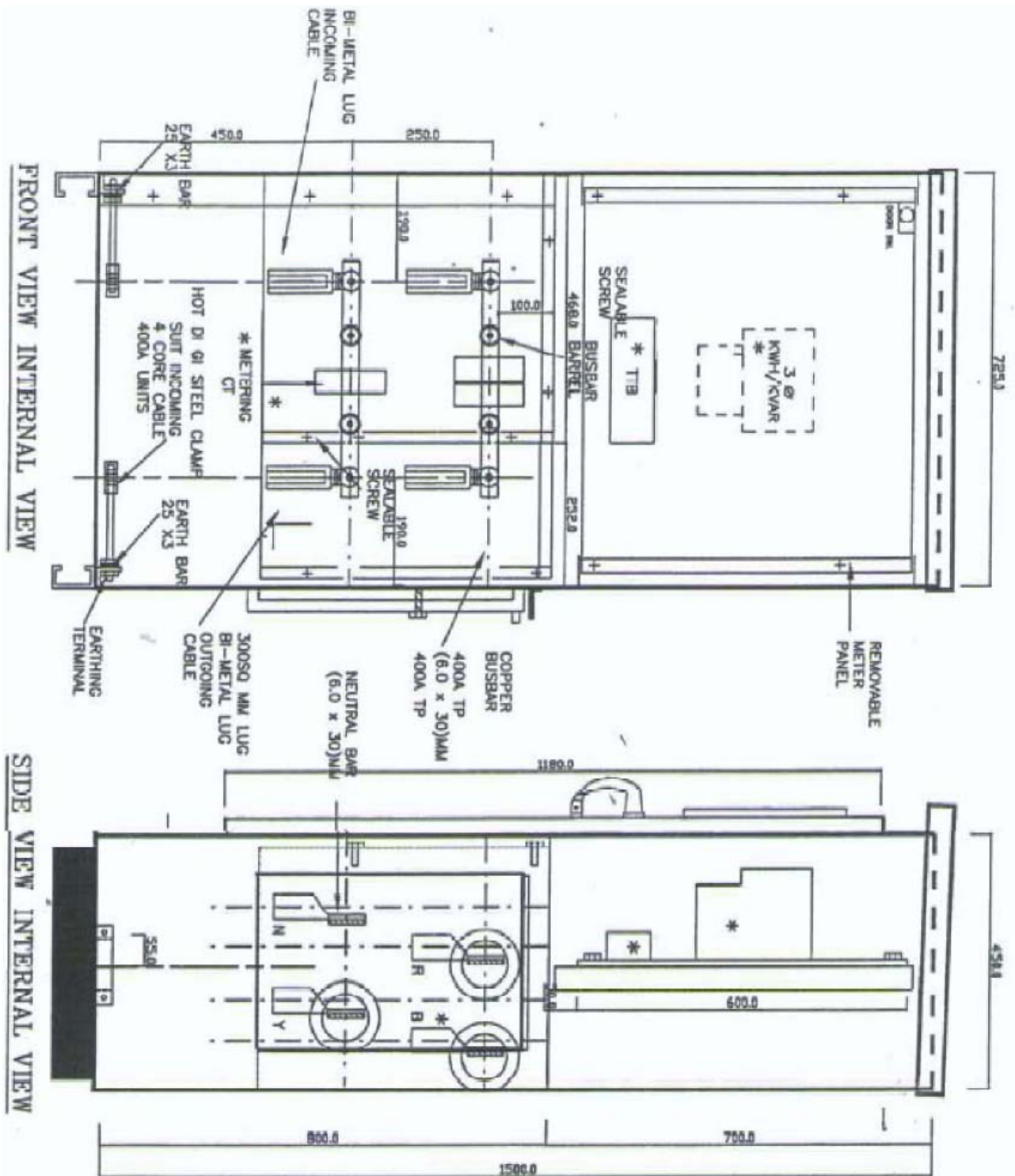
.....
(HAJI YUSRI BIN SAFRI)
VICE PRESIDENT
(RETAIL)

List Appendix

- Appendix A: Standard drawing of 400A outdoor CT meter cubicle
- Appendix B: Standard drawing of 800A outdoor CT meter cubicle
- Appendix C: Standard drawing of 2000A outdoor CT meter cubicle
- Appendix D: Front and side view of meter cubicle
- Appendix E: Typical concrete plinth
- Appendix F: Meter cubicle clearances
- Appendix G: Location of the LV Outdoor meter cubicle – Immediately outside of the MSB room
- Appendix H: Location of the LV Outdoor meter cubicle – At the fence perimeter
- Appendix I: Location of the LV Outdoor meter cubicle – Meter cubicle outside Substation
- Appendix J: Location of the LV Outdoor meter cubicle – Located within recessed wall
- Appendix K: Sample drawing with Back-to-back Transformer and MSB Room with meter cubicle
- Appendix L: Sample Letter of Undertaking

Appendix A

Standard drawing of 400A outdoor CT meter cubicle



INTERNAL LEFT SIDE VIEW

INTERNAL FRONT VIEW

RIGHT SIDE VIEW

DETAIL A

DETAIL B

DETAIL C

DETAIL D

DETAIL E

DETAIL F

DETAIL G

DETAIL H

DETAIL I

DETAIL J

DETAIL K

DETAIL L

DETAIL M

DETAIL N

DETAIL O

DETAIL P

DETAIL Q

DETAIL R

DETAIL S

DETAIL T

DETAIL U

DETAIL V

DETAIL W

DETAIL X

DETAIL Y

DETAIL Z

DETAIL AA

DETAIL AB

DETAIL AC

DETAIL AD

DETAIL AE

DETAIL AF

DETAIL AG

DETAIL AH

DETAIL AI

DETAIL AJ

DETAIL AK

DETAIL AL

DETAIL AM

DETAIL AN

DETAIL AO

DETAIL AP

DETAIL AQ

DETAIL AR

DETAIL AS

DETAIL AT

DETAIL AU

DETAIL AV

DETAIL AW

DETAIL AX

DETAIL AY

DETAIL AZ

DETAIL BA

DETAIL BB

DETAIL BC

DETAIL BD

DETAIL BE

DETAIL BF

DETAIL BG

DETAIL BH

DETAIL BI

DETAIL BJ

DETAIL BK

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DETAIL BM

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DETAIL BU

DETAIL BV

DETAIL BW

DETAIL BX

DETAIL BY

DETAIL BZ

DETAIL CA

DETAIL CB

DETAIL CC

DETAIL CD

DETAIL CE

DETAIL CF

DETAIL CG

DETAIL CH

DETAIL CI

DETAIL CJ

DETAIL CK

DETAIL CL

DETAIL CM

DETAIL CN

DETAIL CO

DETAIL CP

DETAIL CQ

DETAIL CR

DETAIL CS

DETAIL CT

DETAIL CU

DETAIL CV

DETAIL CW

DETAIL CX

DETAIL CY

DETAIL CZ

DETAIL DA

DETAIL DB

DETAIL DC

DETAIL DD

DETAIL DE

DETAIL DF

DETAIL DG

DETAIL DH

DETAIL DI

DETAIL DJ

DETAIL DK

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DETAIL DQ

DETAIL DR

DETAIL DS

DETAIL DT

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DETAIL DZ

DETAIL EA

DETAIL EB

DETAIL EC

DETAIL ED

DETAIL EE

DETAIL EF

DETAIL EG

DETAIL EH

DETAIL EI

DETAIL EJ

DETAIL EK

DETAIL EL

DETAIL EM

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DETAIL EO

DETAIL EP

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DETAIL FC

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DETAIL LG

DETAIL LH

DETAIL LI

DETAIL LJ

DETAIL LK

DETAIL LL

DETAIL LM

DETAIL LN

DETAIL LO

DETAIL LP

DETAIL LQ

DETAIL LR

DETAIL LS

DETAIL LT

INTERNAL LEFT SIDE VIEW

700
800
450

METER VOLTAGE SUPPLY (L1,L2,L3) ONE HOLE C/W BOLT, NUT AND SPRING WASHER L1, L2, L3 & N 2 x 6mm x 10mm TUNED COPPER BOARD 40mm x 5 NOS. SMC BUSBAR SUPPORTS METERING CT 2000/5A C.L. 15VA

DETAIL C
SEALABLE

INTERNAL FRONT VIEW

REMOVABLE METER PANEL 600mm (H) x 650mm (W)

SEALABLE SCREW

WIND LIMIT SWITCH

BRACKET #10mm FOLDING REMOVABLE SIDE COVER 12 X M10 BOLTS FOR BUSBAR

POLYCARBONATE COVER 3mm THICK VIEWING WINDOW 200mm x 300mm MIN. 2mm THICK

DETAIL A
KEYLESS, PULL-OUT & LOCKABLE SEALABLE

DETAIL B
2 NOS. WOODEN CLAMP FOR 12 NOS. 1C 300mm² CABLE

3 NOS. 3mm ED STEEL BASE PLATE W/ SQUARE HOLE FOR CABLE ENTRY

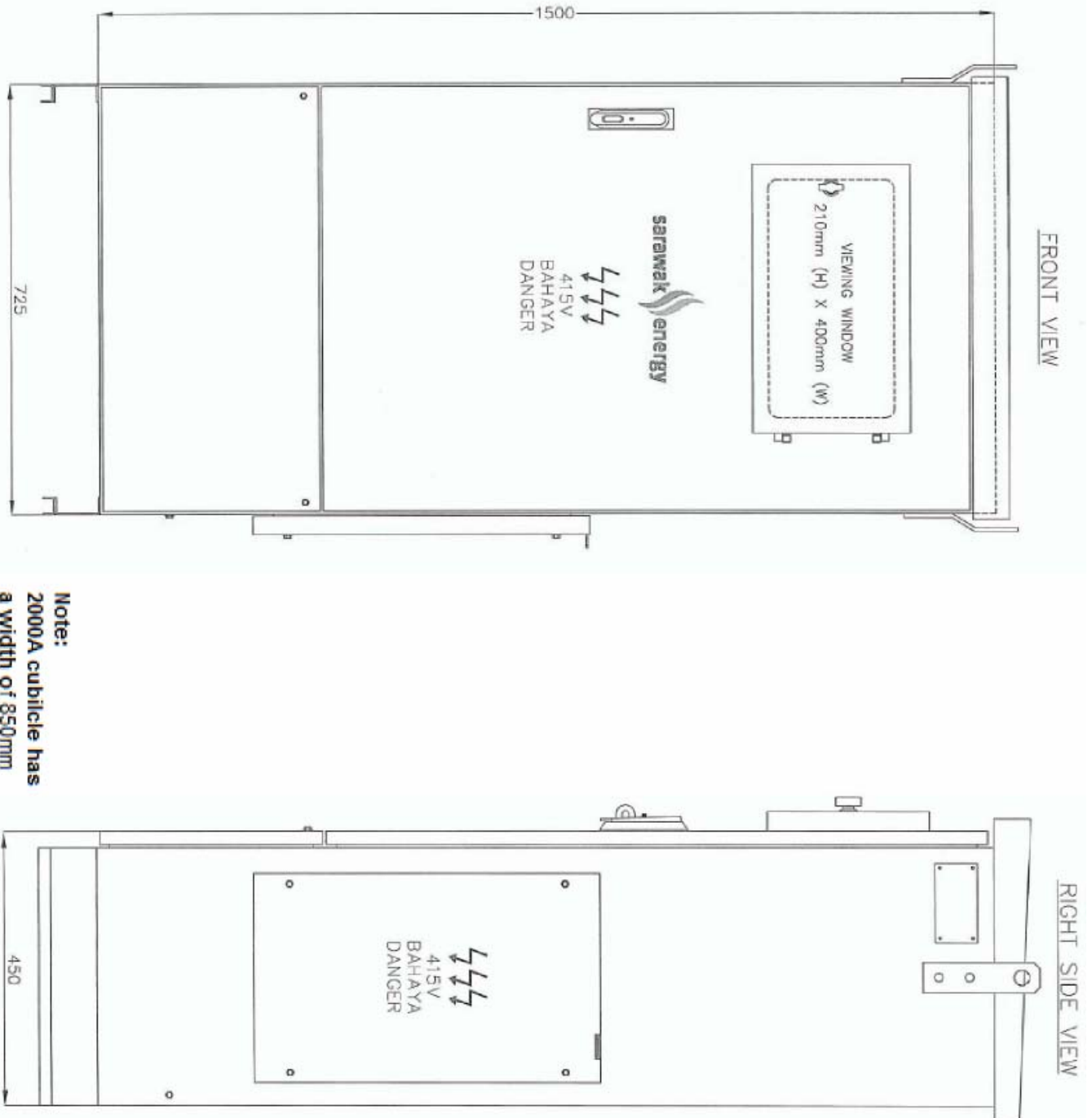
RIGHT SIDE VIEW

450

L1 L2 L3 N

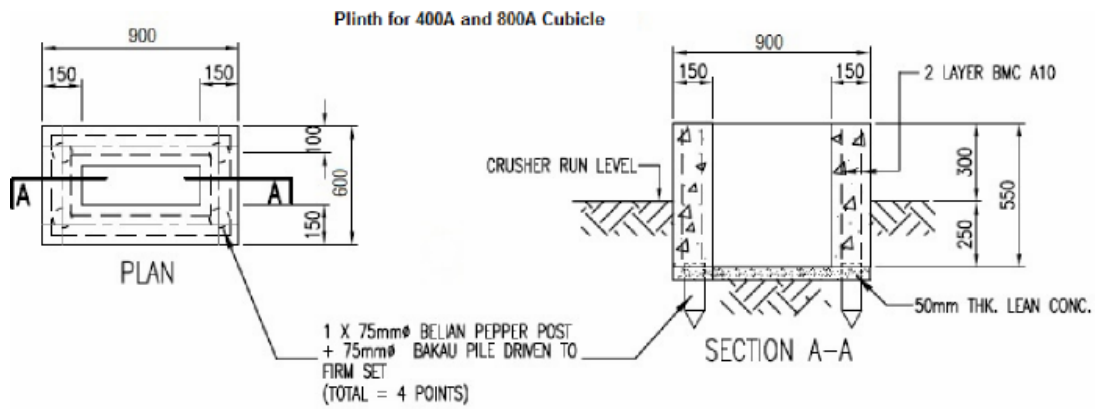
Appendix D

Front and side view of meter cubicle



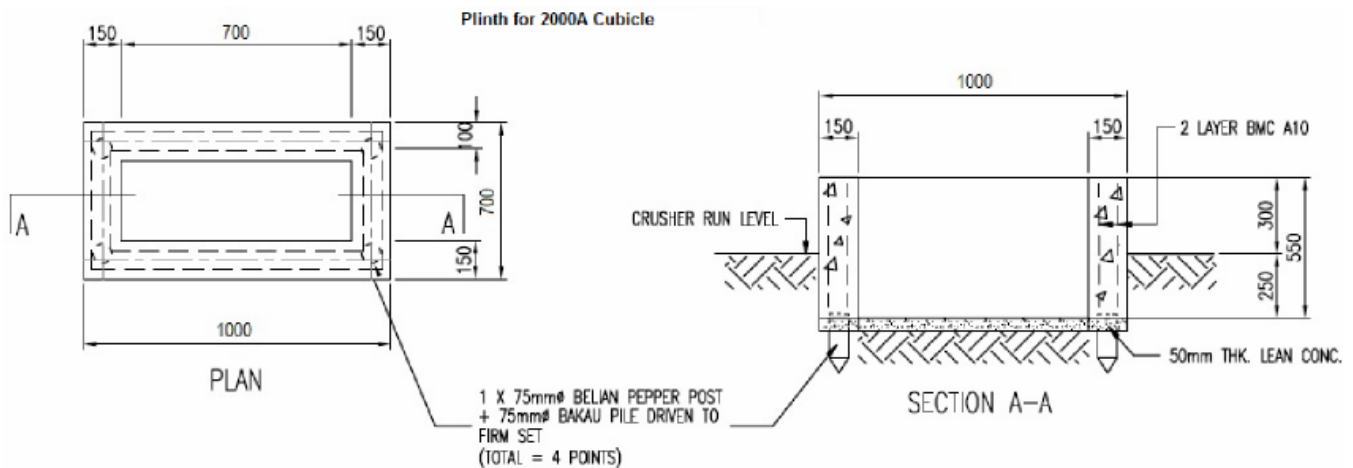
Appendix E

Typical concrete plinth



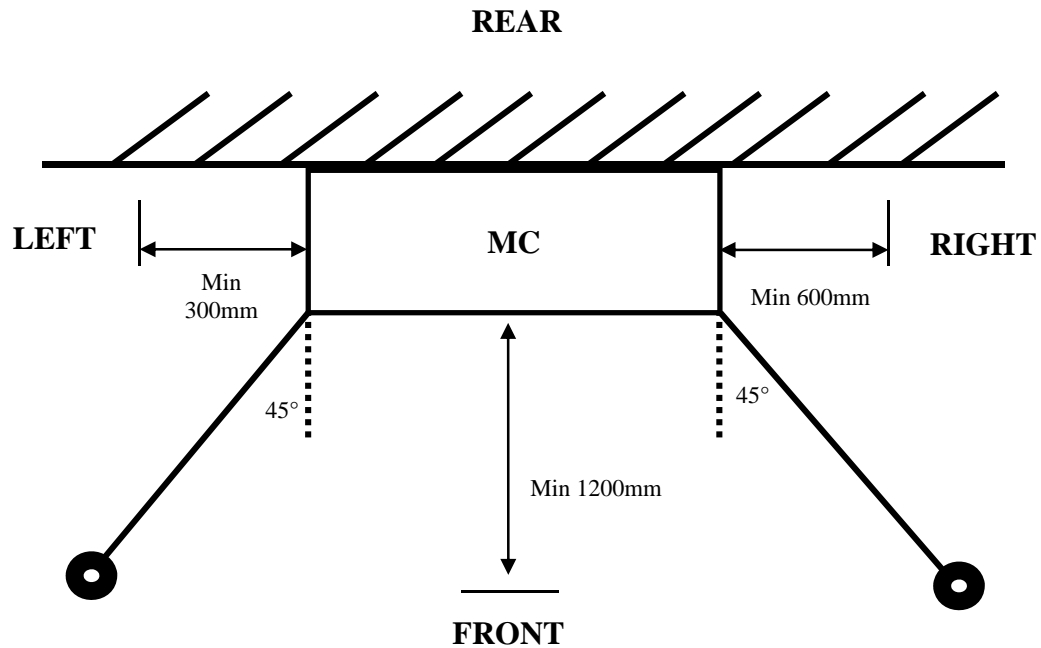
NOTE :

1. ALL CONC. MIX SHALL BE GRADE 25
2. PILING AS AND WHERE NECESSARY
3. ALL PLINTH DIMENSION TO BE CONSTRUCTED ACCORDINGLY
WITH ACTUAL EQUIPMENT DIMENSION ON SITE
4. SAND FILLING TO BE DONE AFTER INSTALLATION OF EQUIPMENT



Appendix F

Meter cubicle clearances

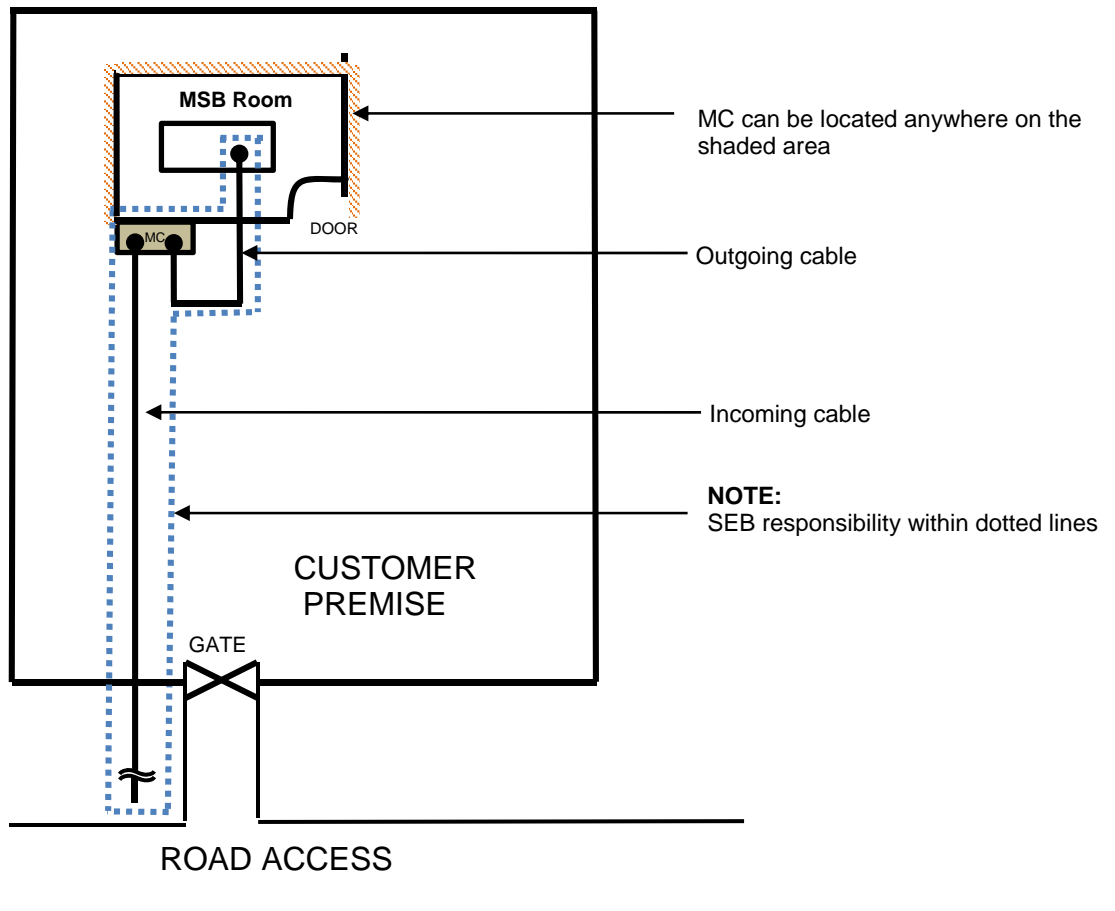


NOTE

- A minimum clearance of 300mm shall be maintained for the left side, 600mm for the right side and 1200mm for the front side.
- A minimum of 2 guard posts/ bollard (100mm diameter) may be installed at a distance of 500mm to 600mm from the edges of MC for area with moving vehicles.

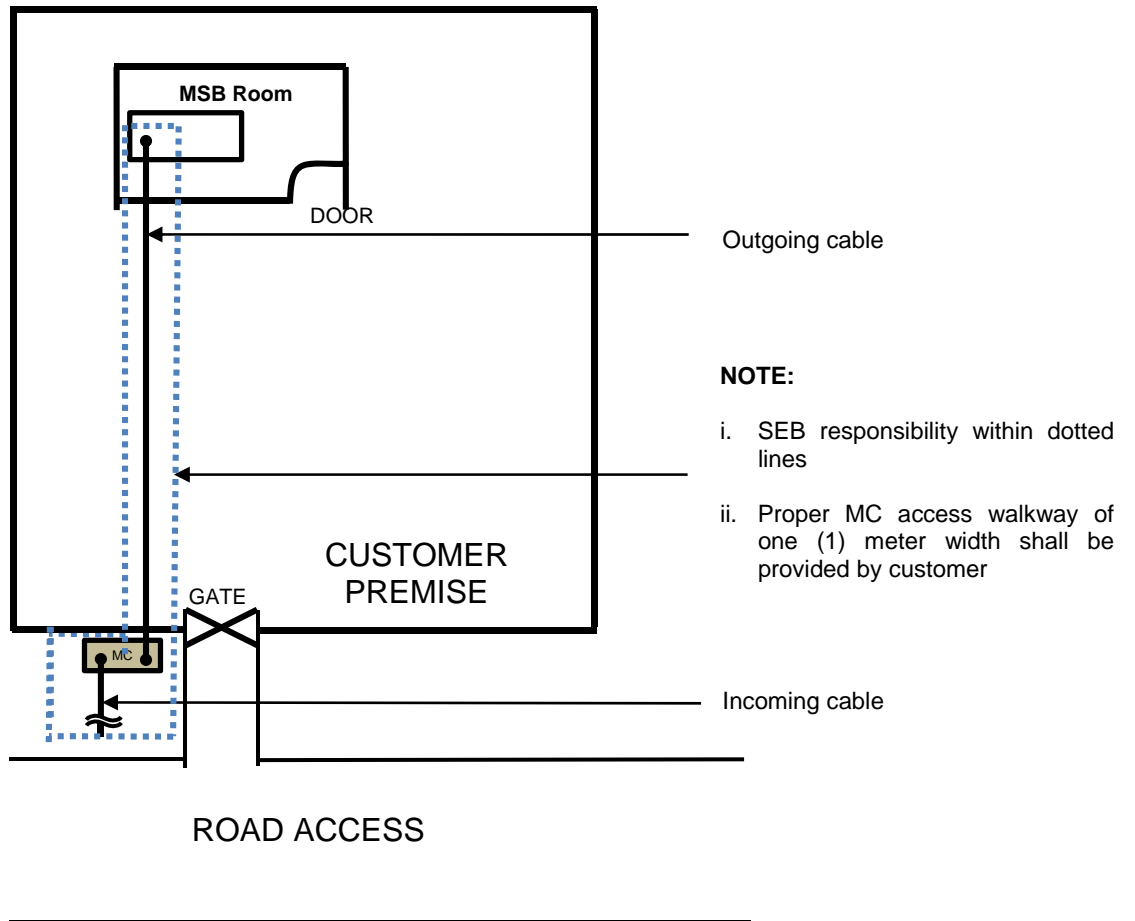
Appendix G

Location of the LV outdoor meter cubicle: Option 1 - Immediately outside of the MSB room



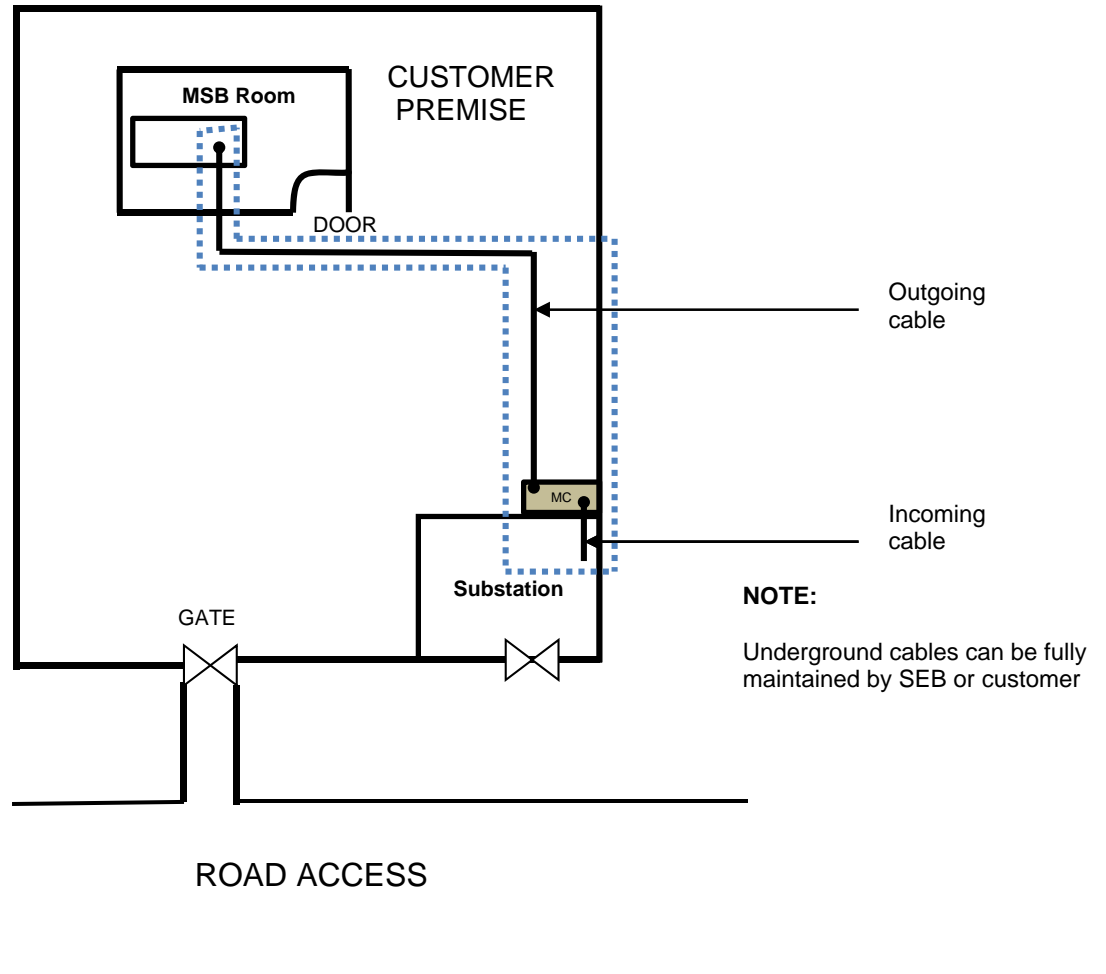
Appendix H

Location of the LV outdoor meter cubicle: Option 2 - At the fence perimeter



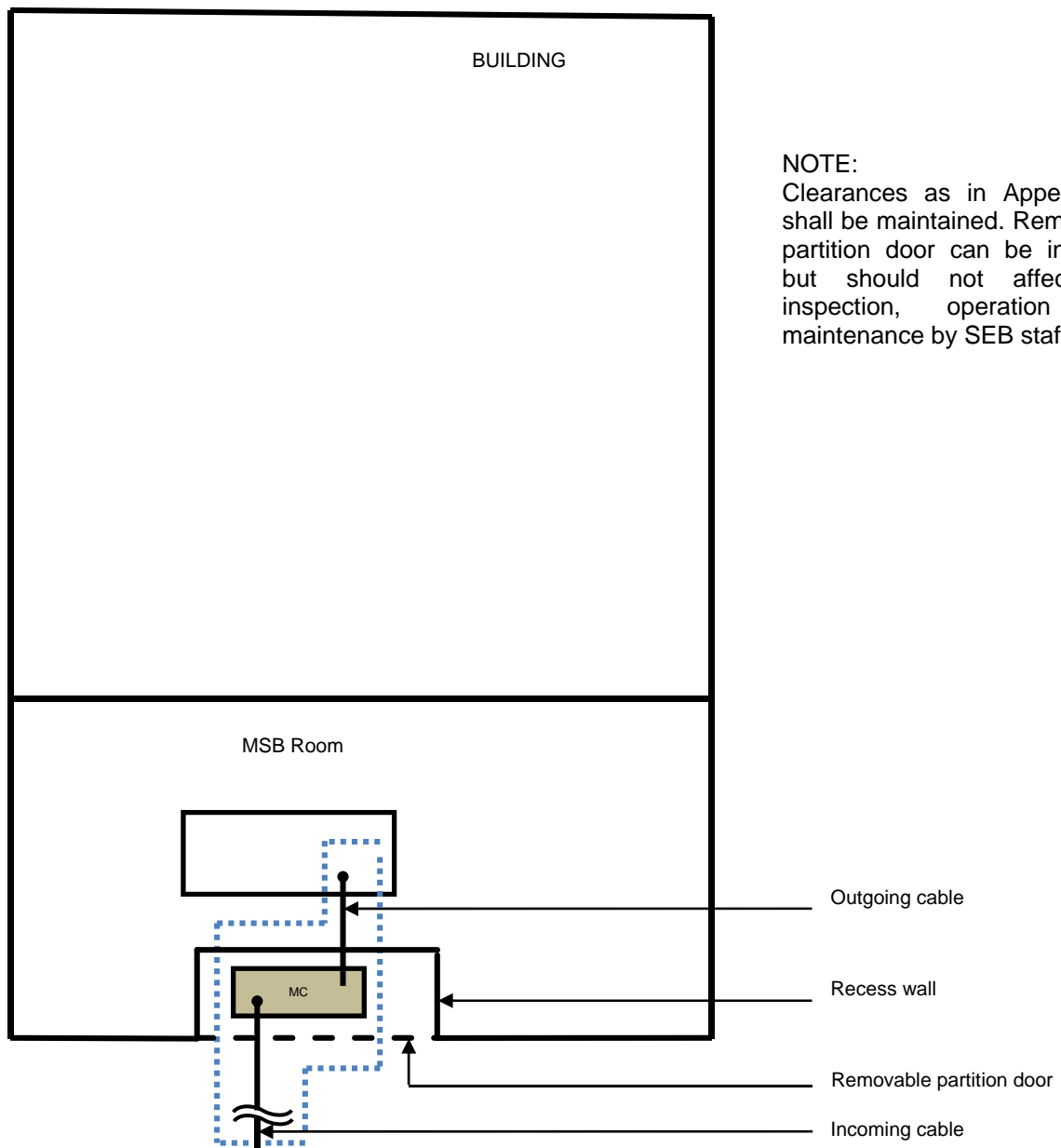
Appendix I

Location of the LV outdoor meter cubicle: Option 3 - Meter cubicle outside Substation



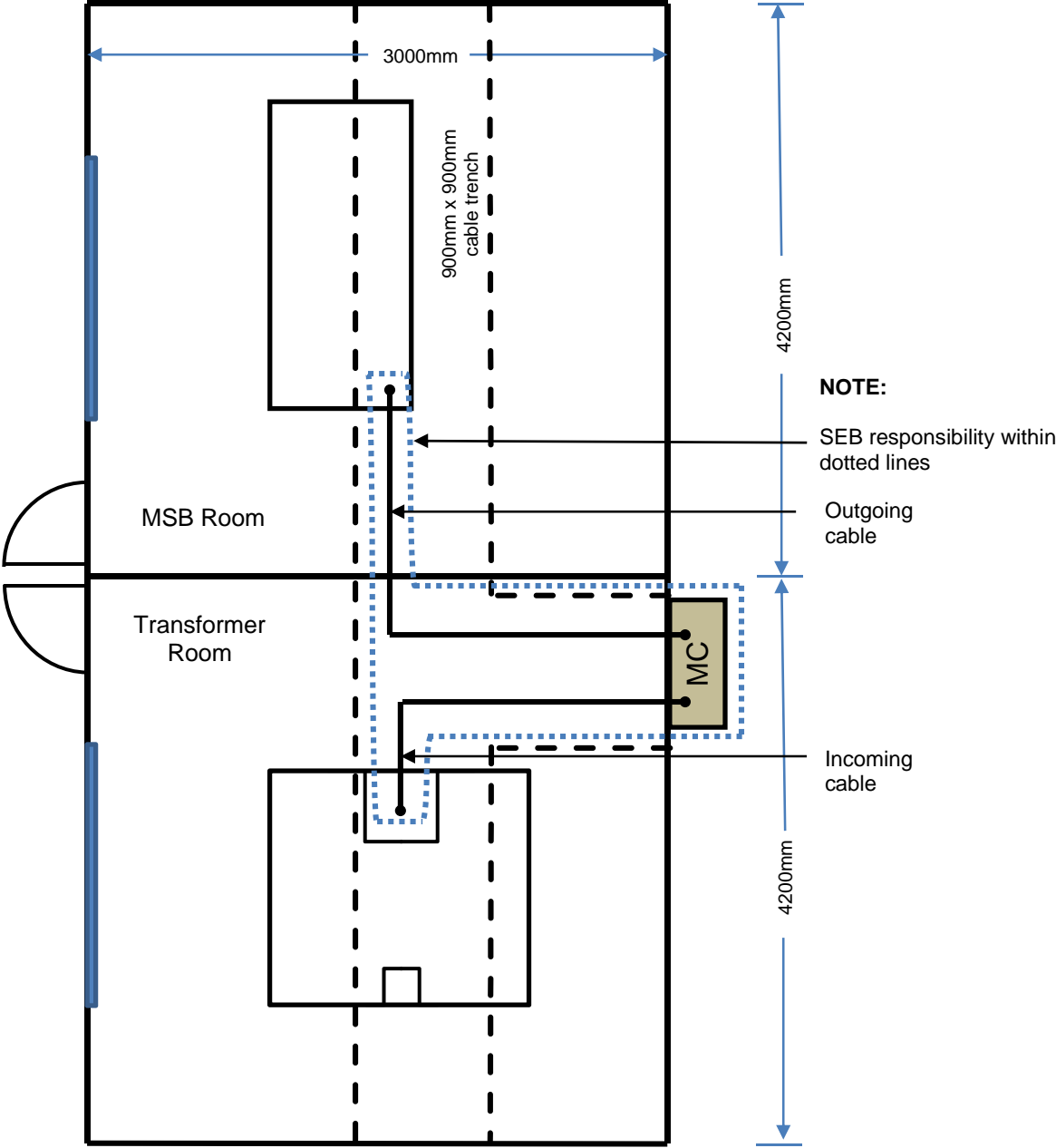
Appendix J

Location of the LV outdoor meter cubicle: Option 4 - Located within recessed wall



Appendix K

Sample drawing with Back-to-back
Transformer and MSB Room with Meter Cubicle



Appendix L

Sample Letter of Undertaking

FORM-LOU

LETTER OF UNDERTAKING

Your Ref.

Our Ref.....

Regional Manager,
SESCO Regional Office,
.....

Dear Sir,

PROJECT:

.....

Please be advised that we are the owner of the above mentioned premise/ building and will be fully responsible of the portion of the electrical installation/system, namely:

.....
.....
.....

(to attach drawings where relevant)

We shall ensure the proper and safe maintenance and operation of our electrical installation/system within our premises/ buildings and under our responsibility in compliance with all the Rules, Regulation and Practieces so as not to affect the performance or reliability of SESCo's distribution system.

We shall be responsible to make good our installation/ system in the event of any failure of our installation/ system or in the event the installation/ system affect the performance or reliability of SESCo's distribution system. We shall comply with the relevant Standard Operating Procedure (SOP), Engineering Circulars (EC) and Policy, Procedure and Guideline (PPG) prior to any energization.

We shall not alter or change the connection scheme of the installation/ system without prior consent and approval in writing from SESCO.

.....
(Customer/owner name and signature)
Customer/owner contact
Customer/owner IC No.

.....
(Contractor name, signature and
company stamp)
Contractor contact
Contractor address