



MINISTRY OF UTILITIES SARAWAK ELECTRICAL INSPECTORATE UNIT

GUIDELINE FOR

INSTALLATION AND APPROVAL OF ELECTRIC FENCE

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1.0 INTRODUCTION

Electric security fencing is a form of security for property which is becoming increasingly popular to act as a deterrent to the intrusion of unauthorized persons onto private property.

This Standard Operating Procedure (SOP) serves as a guide on the procedure for installation and approval of electric fence in Sarawak. This SOP was formulated through discussions with representatives from the Ministry of Environment and Public Health, DBKU, MBKS and BDA.

Electrical Inspectorate Unit expresses its gratitude to all those involved, and especially to the Ministry of Environment and Public Health, DBKU, MBKS and BDA who have cooperated significantly in the formulation and completion of this SOP.

Electrical Inspectorate Unit (EIU) under the Ministry of Public Utilities reserves the right to amend and introduce new requirements to the aforementioned procedure of obtaining an installation and approval of electric fence from time to time.

2.0 OBJECTIVE

It covers for installation and approval of electrified security fences used in all types of situations e.g. residential, industrial, commercial and domestic sites.

This SOP is intended to enforce the method of installing the electric fence in order to improve the safety level of the installation according to MS IEC 60335-2-76 standard. This SOP is also to inform of the procedures that must be complied with by the applicant in order to obtain approval from the Electrical Inspectorate Unit on the installation of electric fence.

It is hoped that the SOP will ensure that installation of electric fence will be based on correct safety procedures and regulations and to avoid any possible accidents. Safety requirements for electric security fences have to be met to eliminate accidents causing physical injuries and loss of life or property.

To establish guidelines to be used in association with Council's By Laws 75 (Fence & Boundary Walls), which is allowing for the installation of electric fencing subject to local council approval and conditions.

3.0 SCOPE

The procedures described herein details out the processes involved in processing of applications for installation and approval of electric fence in Sarawak. The procedures are applicable both to the applicants and officers in the EIU, KASKA, MBKS, DBKU and BDA who handle such applications.

This SOP also provide guidance to applicants/owner, competent person, EIC Contractor, Local Council and EIU staffs for the processing and determination of applications for the installation and approval of electric fencing in Sarawak to ensure its safety of use while meeting basic requirements for the design, installation, maintenance and operation of electrified security fences.

4.0 REFERENCED DOCUMENTS

The following Rules/ Ordinance and standards are referred to in this SOP:-

- i) Electricity Ordinance Chapter 50 (Revised 2002)
- ii) The Electricity Rules 1999
- iii) MS IEC 60335-2-76:2007 Standard: Particular Requirements For Electric Fence Energizers
- iv) The Installation of Electric Fence in Accordance to Procedures by Energy Commission

5.0 ABBREVIATIONS USED

EIU	-	Electrical Inspectorate Unit
EIC	-	Electrical Installation Contractor
KASKA	-	Ministry of Environment and Public Health
DBKU	-	Kuching North City Council
MBKS	-	Kuching South City Council
BDA	-	Bintulu Development Authority

6.0 COMPLIANCE WITH LEGISLATION

It is a fundamental requirement that electrified security fence systems are designed, constructed, installed, operated and maintained in accordance with this document so that they cause no danger to persons, animals or surroundings and minimize the risk of accidental contact, unless they attempt to climb or penetrate the physical barrier or are in the area without authority. Electric fence shall be installed in accordance with The Electricity Rules, 1999 and Electricity Ordinance (Chapter 50) in particularly the following section/ rules:-

6.1 Electricity Ordinance (Cap. 50) – Section 8

- i) Section 8 – (1) (b) The Director of Electricity Supply shall not issue the notice of commencement unless he is satisfied that the licensee has complied with all the requirements of this Ordinance or any other written law applicable to the construction of the installation or power generating plant.
- ii) Section 8 – (1) (c) The Director of Electricity Supply or any Inspector or any other person authorized by him in writing may inspect the works and the installation or power generating plant during the construction and, upon receipt of notice of completion of it, a final inspection shall be carried out by the Director of Electricity Supply or Inspector or any other person authorized by him, before a Certificate of Completion of it is issued by the Director of Electricity Supply.
- iii) Section 8 – (1) (d) In addition to the inspections referred to in paragraph (c), all installations or power generating plants, while in operation, shall be subject to such periodical inspections as shall be determined by the Director of Electricity Supply.
- iv) Section 8 – (1) (e) The management or person in charge of any installation or power generating plant shall afford full facilities and cooperation for inspections to be carried out under this section.
- v) Section 8 – (2) In addition to periodical inspections during construction and final inspections on completion, all installations, while in operation, shall be subject to such periodical inspections as may be prescribed.

- vi) Section 8 – (3) The licensee and management and persons in charge of any installation or of the construction of any installation shall afford full facilities for inspection during all reasonable times.

6.2 The Electricity Rules, 1999 – Rule 15, 64, 67, 74, 105, 106

- i) Rule 15 – Any apparatus, conductor or accessory for the purpose of connection to an installation shall be sufficient in size, power and number to serve the purpose for which it is intended and shall be constructed, installed, arranged, protected, worked and maintained in such a manner as to prevent danger.
- ii) Rule 64 – The competent persons, who shall, on request, prepare and submit plans, drawings and specifications are as provided in Part VI of the Second Schedule.
- iii) Rule 67(1) – Any Electrical Services Engineer, Competent Electrical Engineer or Electrical Supervisor who is required to inspect an installation under rule 66 shall inspect the installation and shall record and direct all findings, recommendations and instructions to the Director of Electricity Supply and the owner, management or licensee of the installation, as the case may be.
- iv) Rule 74(1) – No person shall perform or carry out any electrical work unless he holds a valid Certificate of Registration as an Electrical Installation Contractor issued under these Rules.
- v) Rule 105(1) – An installation shall be maintained in good and working order and safety precautions shall be observed at all times to prevent danger.
- vi) Rule 106 – No person, except a competent person or a person acting under the control of a competent person, shall undertake to carry out any repair, replacement, servicing or cleaning of any equipment which forms part of an installation.

7.0 GENERAL REQUIREMENT FOR INSTALLATION OF ELECTRIC FENCE

To ensure the installation of electric fence is continuously carried out in a proper and safe manner, the Electrical Inspectorate Unit under Ministry of Public Utilities has provided the method of installing the electric fence which complies with standard of MS IEC 60335-2-76 – Particular requirements for electric fence energizers. (Note: MS IEC 60335-2-76 standard can be purchased from SIRIM Berhad).

7.1 MS IEC 60335-2-76:2007 – Particular Requirements for Electric Fence Energizers

Among the priority that should be put into consideration in construction of electric fencing whether for energizer type A, B, C or D condition as stated in MS IEC 60335-2-76:2007 standard detailed in the following Clauses and Annexes:-

- i) Clause 22.108 – Energizer output characteristics shall be such that
 - The impulse repetition rate shall not exceed 1 Hz
 - The impulse duration of the impulse in the 500 Ω component of the standard load shall not exceed 10 ms
 - For energy limited energizers the energy/impulse in the 500 Ω component of the standard load shall not exceed 5 Joule (J)

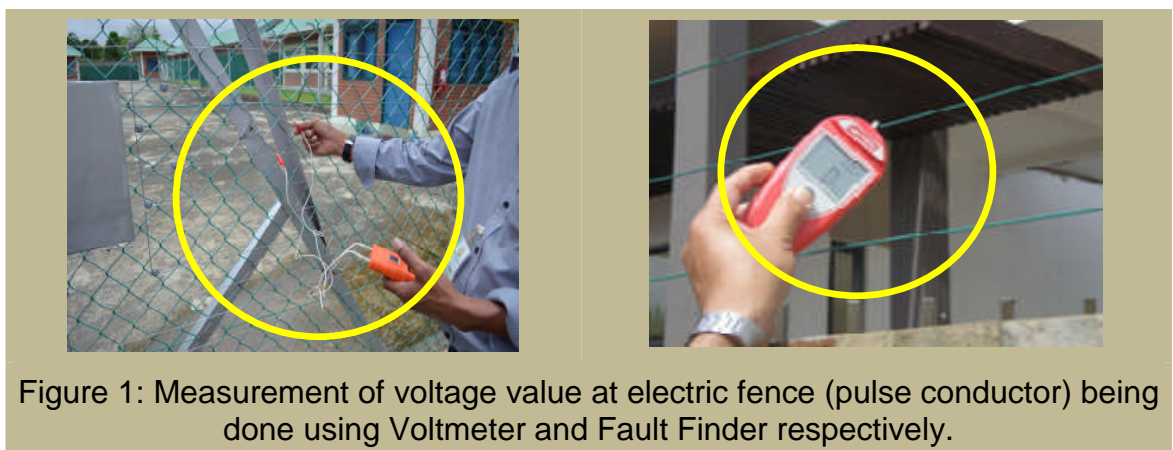


Figure 1: Measurement of voltage value at electric fence (pulse conductor) being done using Voltmeter and Fault Finder respectively.

- Clause 22.109 – If the energizer is provided with more than one fence circuits (sometimes defines as zone), the output characteristics shall be within the limits in 22.108 for any possible connection of the fence circuits. The impulses for the individual sets of output terminals shall

be synchronized. (Note: fence circuit is also known as zone) Annex BB – Instructions for installation and connection of electric fences.

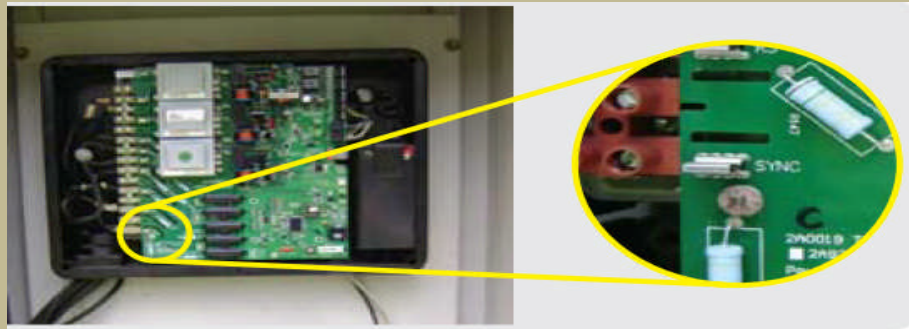


Figure 2: The use of panel for synchronizing supply system if more than one energizer applies.

i) Annex BB1 & BB2 – Requirement for electric animal/security fence:-

- An electric animal/security fence shall not be supplied from two separate energizers or from independent fence circuits of the same energizer.
- For any two separate electric animal/security fences, each supplied from a separate energizer independently timed, the distance between the wires of the two electric animal/security fences shall be at least 2.0/2.5 m. If this gap is to be closed, this shall be affected by means of electrically non-conductive material or an isolated metal barrier.

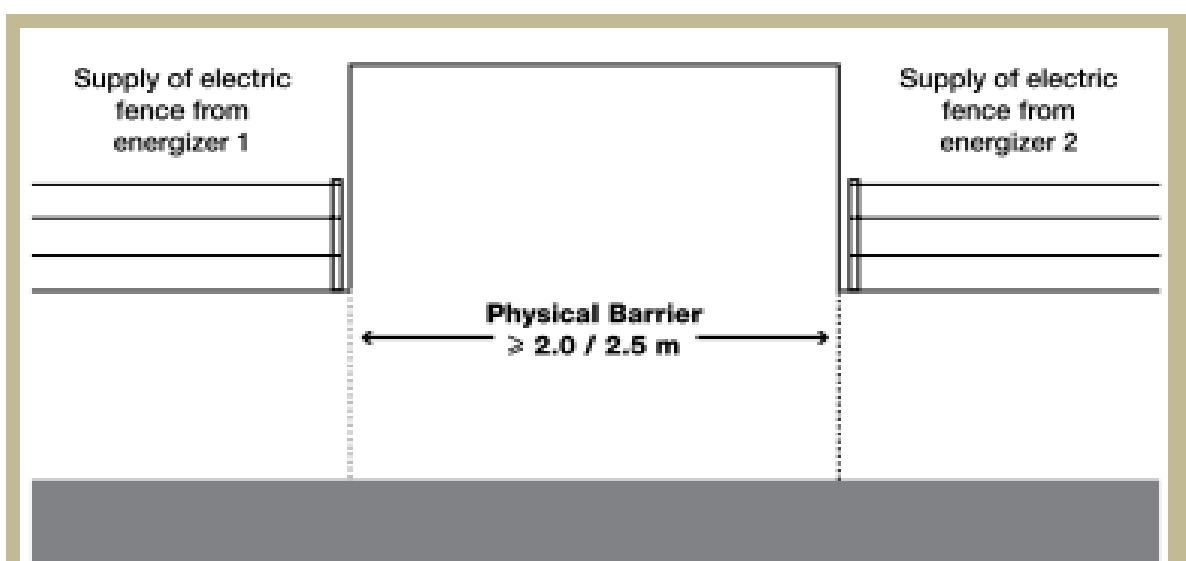
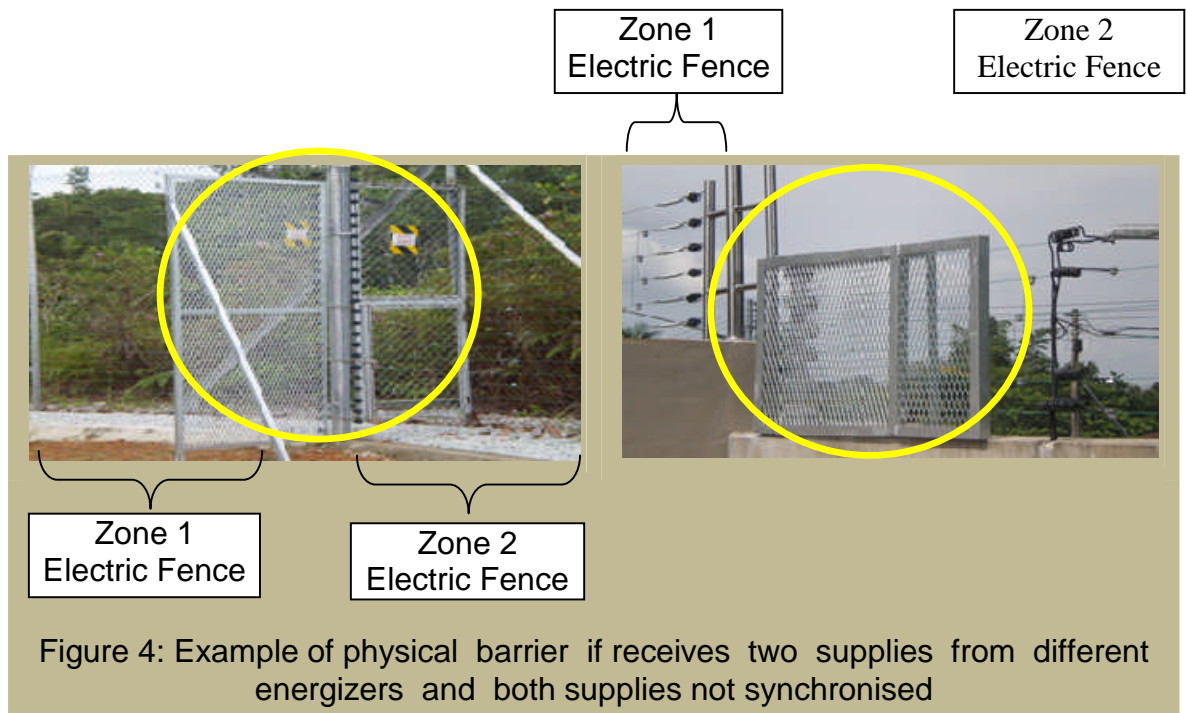


Figure 3: Distance of physical barrier shall be at least 2.0 / 2.5 meters if receives two supplies from different energizers and both supplies not synchronized (Note: 2.0 m for animal while 2.5 m for security).



ii) Annex CC – Installation of electric security fences

iii) Annex CC.2 – Location of electric security fence

- The electric fence should be separated from the public access area by means of a physical barrier.
- Where an electric fence is installed in an elevated position, such as on the inner side of the window or skylight, the physical barrier may be less than 1.5 m high where it covers the whole of the electric fences. If the bottom of the window or skylight is within a distance of 1.5 m from the floor or access level then the physical barrier need only extend up to a height of 1.5 m above the floor or access level.

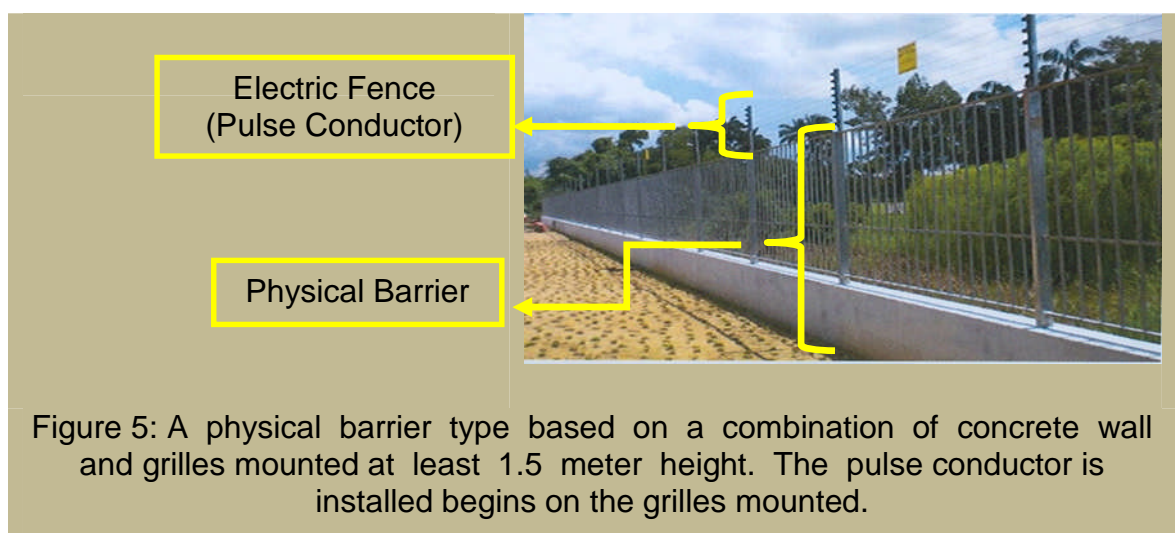




Figure 6: A physical barrier type based on a combination of chain-link (wire) at least 1.5 meter height. The pulse conductor is installed begins on the ground or physical barrier may be less than 1.5.

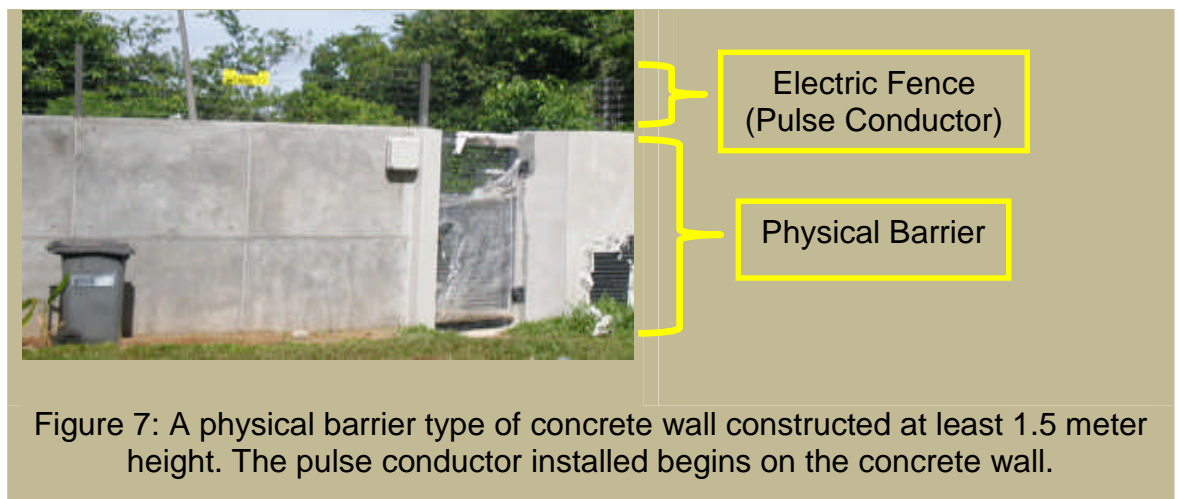


Figure 7: A physical barrier type of concrete wall constructed at least 1.5 meter height. The pulse conductor installed begins on the concrete wall.

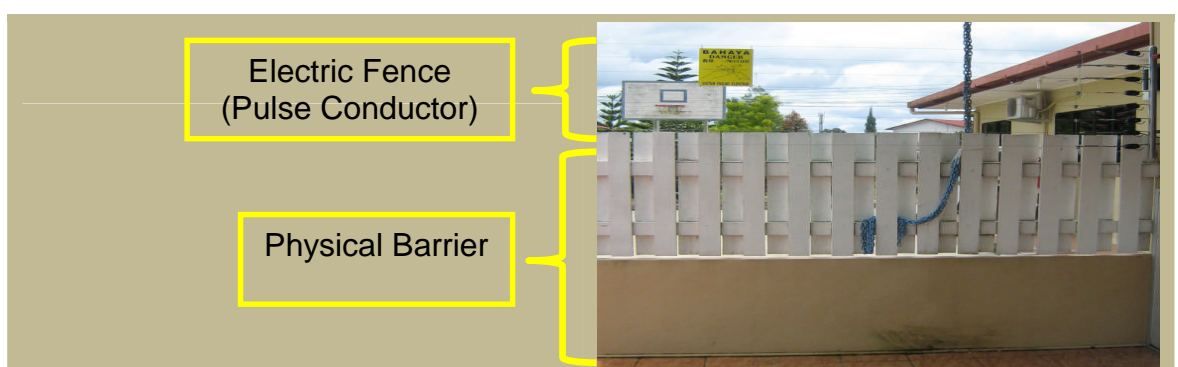
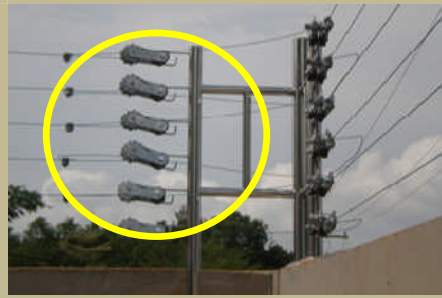


Figure 8: A physical barrier type based on a combination of concrete wall and wood mounted at least 1.5 meter height. The pulse conductor installed begins on the wood mounted.



Screw Tensioner



Lightning Arrester
(for lightning
protection)



Earth Chamber (For
earthing of lightning
protection system)

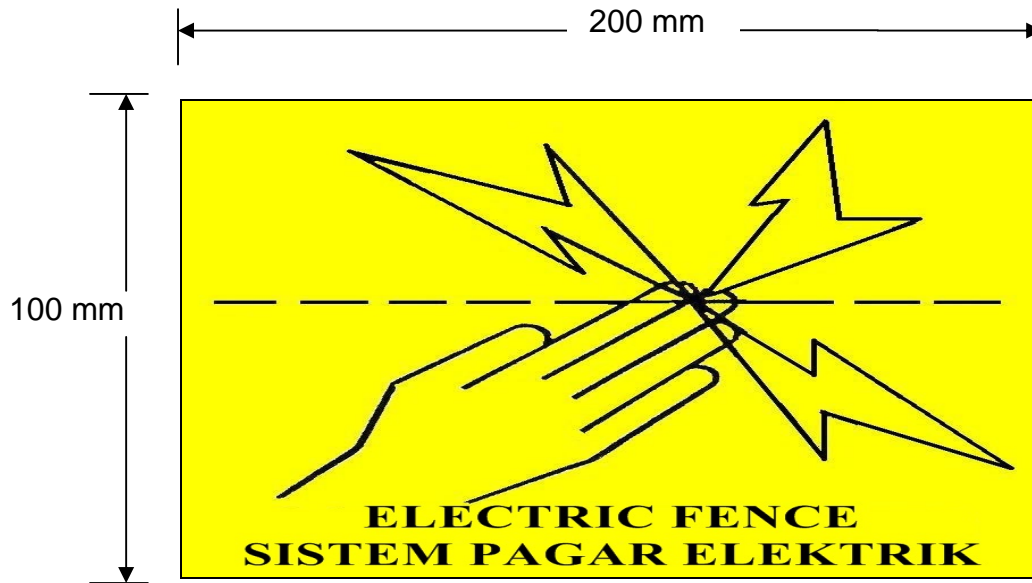
Figure 9: Other Information Related to the Installation of Electric Fence

7.2 Warning Sign for Electric Fence System

When an electric fence is installed where it might reasonably be expected to be touched by the public, then warning signs must be attached. Any part of an electric security fence that is installed along a public road or pathway shall be identified at frequent intervals by warning signs securely fastened to the posts or firmly clamped to the fence wires.



Figure 10: Warning Sign CAUTION



The warning sign must be at least 200 x 100 mm in size and should be affixed to the fence at intervals not exceeding 10 meters, at each gate and each access point. The sign should also display the words **ELECTRIC FENCE/ SISTEM PAGAR ELEKTRIK** or show the symbol depicted. The inscription shall be indelible, inscribed on both sides of the warning sign and have a height of at least 25 mm. The background colour of both sides of the warning sign shall be yellow with black inscription.

7.3 Compliance with Other Relevant Local Council Requirements.

- i) Fence & Boundary Walls – By Laws 75
 - a) Solid Fencing – maximum height shall be 1.8m;
 - b) Non-Solid Fencing (defined as grill or chain-link fencing) – maximum height shall be 2.75m;
 - c) where levels between site and adjacent lots are different: -
 - If height of retaining wall is 1.8m or more, no solid fencing/wall for the lot with higher ground level shall be allowed. However, fencing which is constructed to permit the passage of light and air to a maximum height of 2.75m from the ground of the higher lot shall be allowed.

- For retaining wall less than 1.8m, solid wall/fence shall be allowed to the lot with the higher ground. However, the maximum total height of the retaining wall and the solid fence / wall shall be 1.8m. Fence / Wall which do not exceed 2.75m in height, so as to permit the passage of light and air, shall be allowed.
- ii) Any other relevant local council consideration, the public interest in general and the locality surrounding the proposed development in particular.

7.4 Other Requirement Related to the Installation of Electric Fence

- i) Competent Electrical Engineer (CEE) in charge of the electric fence installation to make sure that all installation must comply with the requirement as stated in MS EIC 60335-2-76 standard. (Note: Refer to the latest edition of MS EIC 60335-2-76 from time to time).
- ii) For common fencing case, the consent must be obtained from the owners of houses sharing the common fencing before installing the electric fencing at this point.
- iii) All energizers connected to the electric fence system must be tested in accordance to the IEC 60335-2-76 standard – Particular requirements for electric fence energizers. Direct energizer from other supply or electricity supply from SESCO is NOT ALLOWED.
- iv) The electric fence owned by a premise owner is only allowed to be commissioned and energized upon obtaining a written approval from Electrical Inspectorate Unit.

7.5 Maintenance of Electric Fence

- i) Once erected, electric fences must be continuously inspected and maintained. Routine inspections are required to ensure that they continue to operate effectively and this include the checking of batteries and examination of the fence for any problems which could reduce

its effectiveness, such as sagging wires, debris or vegetation growing against it.

- ii) A minimum of one inspection per year shall be carried out to ensure safe optimum system performance such inspection report shall be submitted to Electrical Inspectorate Unit.

8.0 METHOD OF APPLICATION

Upon completion, application forms (Forms EIU/FEF/01) must be submitted to the Electrical Inspectorate Unit, Ministry of Public Utilities, 11th Floor, Wisma Satok, Jalan Satok, 93400 Kuching.

8.1 Agencies Involved In the Approval for Installation of Electric Fence

- Ministry of Environment and Public Health;
- Kuching North City Council (DBKU)
- Kuching South City Council (MBKS)
- Bintulu Development Authority (BDA)

8.2 Determination of Applications

In determining the suitability of any application, the Electrical Inspectorate Unit shall have regard to the objectives and provisions of its Local Council, and/or any other relevant matter, and may take into account:

- i) The nature of the proposed electric fence installation in relation to the development either existing or proposed, on adjoining property.
- ii) Electric fences are not permissible in any form in the “Recreational” zone and/or in the “Recreation Zone – Residential”. Electric fences may be considered on a purely discretionary basis, in all other zones.
- iii) In the case where a property subject of an electric fence application is adjacent to common fence at residential zone, the applicant shall submit

a letter of consent from the owner(s) and/occupiers of all such residential properties.

- iv) The design and appearance of the electric fencing, and its effect upon the amenity of the existing buildings in the area generally.
- v) In the event of any objection in respect of any application for the installation of an electric fence (including any objection in respect of any property abutting a residential property) the matter of the consideration of such application shall be referred to Local Council for consideration.

8.3 Approvals

Any approval for installation of electric fence shall include the following conditions as a minimum, viz.,

- i) All installation must be complying with the requirements of relevant parties such as local councils.
- ii) Complete installation of electric fence should be tested by the competent person. For this purpose, Form G (Inspection Certificate) as required in Rules 67 of The Electricity Rules, 1999 need to be completed by the competent person.

8.4 Application Procedure for Installation of Electric Fence

All completed form (Form EIU/FEF/01) submitted must be attached with the following items:-

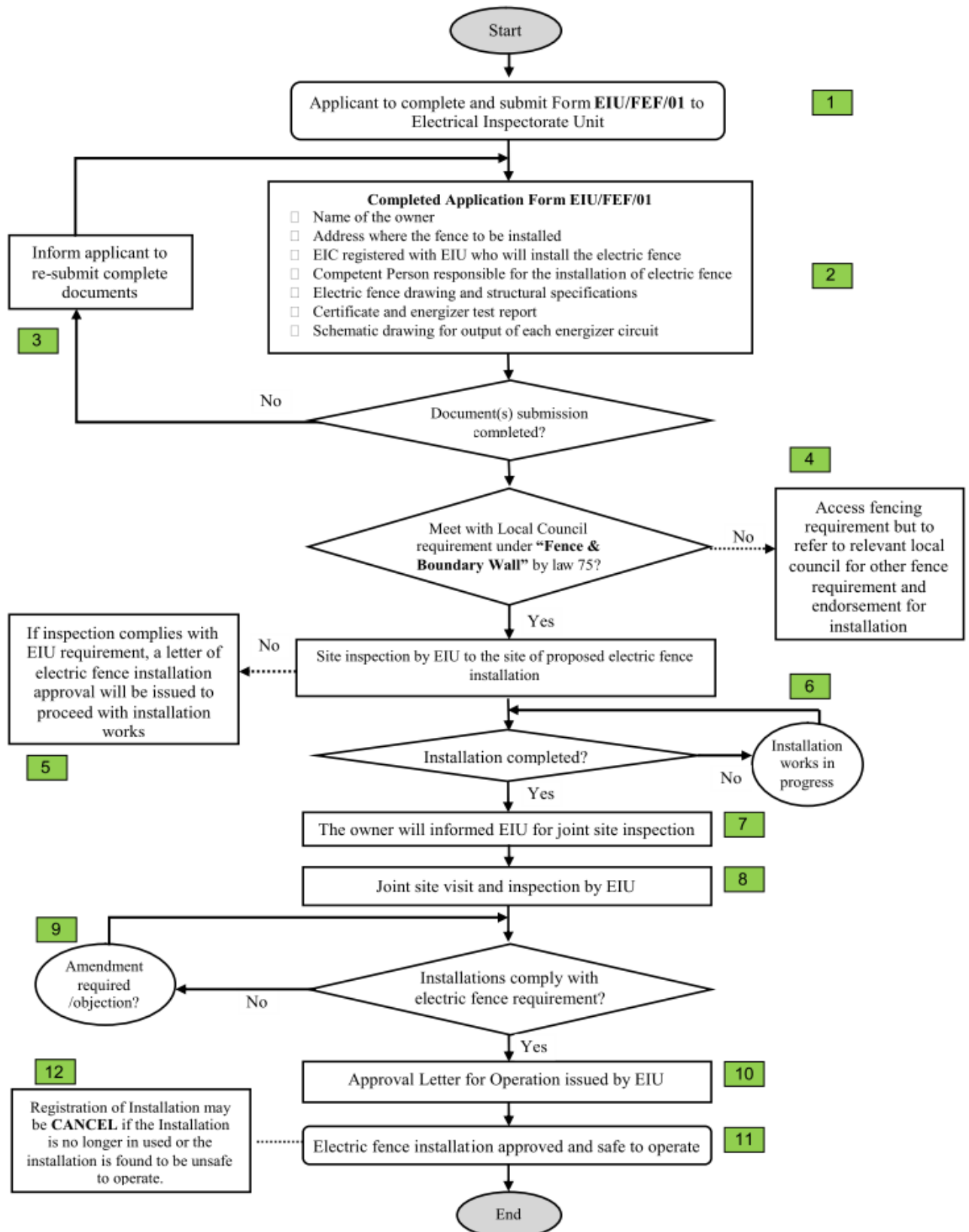
- i) Name of the owner of the premises or installation
- ii) Address where the electric fence is to be installed and total perimeter of the installation.
- iii) Particulars of Electric Installation Contractor registered with EIU who will install the electric fence and particulars of competent person who will be responsible for designing, installing, supervising, testing and commissioning the fence.
- iv) Complete electric fence drawing and structural specifications that describe the height, type, equipment, made, direction and others. Every components and equipment in the drawing must be labeled clearly. The

drawing(s) must be signed and certified by Competent Electrical Engineer appointed by the owner or applicant.

- v) Schematic drawing showing the sources of electric supply to the conductivity wire of the fence, size and type of cable being used. The schematic drawing(s) must be signed and certified by Competent Electrical Engineer appointed by the owner or applicant.
- vi) Certificate and test report for the energizer (type A, B, C or D) must comply with EIC 60335-2-76:2006 standard from IEC CB Scheme lab or APLAC.
- vii) Joint site visit by EIU and the owner of the installation or representative.
- viii) Once the installation of electric fence ready, it should be tested and supervised by the competent person who has been engaged by the owner. For this purpose, Form G (Inspection Certificate) as required in Rules 67 of The Electricity Rules, 1999 need to be completed by the competent person and submitted to Electrical Inspectorate Unit before a written approval letter would be issued to the owner.
- ix) An inspection by the Electrical Inspector from Electrical Inspectorate Unit to the installation premises would be made after installation works are completed. The Electrical Installation Contractor who installed the installation, the responsible Competent Electric Engineer and the owner of the installation or representative must be present during the visit.
- x) After all the installation works have been completed and the electric fencing system tested satisfactory, the owner need to inform EIU for follow up inspection before written approval letter for operation will be issued.
- xi) Electric fence installation owner must appoint a competent person, (at least Electrical Supervisor) to check their installation at least once every 2 years to ensure it is always in good condition and safe for operation. Inspection report on the subject should be sent to Electrical Inspectorate Unit.
- xii) No processing fee is imposed for the approval.

- xiii) The Electrical Inspectorate Unit will cancel the approval on the electric fence installation and operation if the installation is either no longer being used or/and found to be unsafe for operate. This avoids any future hazards and makes way for better working practices in the future.

8.5 Flow Chart for Application Procedure to Install Electric Fence



9.0 APPENDIX I

Address and Contact Number of Agencies Involved In the Approval for Installation of Electric Fence

- a) Electrical Inspectorate Unit
Ministry Utilities Sarawak
11th Floor, Wisma Satok, Jalan Satok, 93400 Kuching, Sarawak.
Tel: 082-258258 Fax: 082-259843
Web: www.mou.sarawak.gov.my

- b) Ministry of Environment And Public Health
Tingkat 2, Bangunan Baitul Makmur, Jalan Medan, 93050 Kuching, Sarawak.
Tel: 6082-319614
Fax: 6082-311216
Web: www.moeswk.gov.my

- c) Kuching North City Council (DBKU)
Bukit Siol, Jalan Semariang Petra Jaya 93050 Kuching, Sarawak.
Tel: 082-446688 Fax: 082-446414
Web: www.dbku.gov.my

- d) Kuching South City Council (MBKS)
Jalan Padungan, 93675 Kuching, Sarawak.
Tel: 082-242311 Fax: 082-417372
Web: www.mbks.gov.my

- e) Bintulu Development Authority (BDA)
No. 1, Jalan Tanjung Kidurong, Peti Surat 55, 97007 Bintulu, Sarawak.
Tel: 086-332011 Fax: 086-336066
Web: www.bda.gov.my