

EN-M1

*KAHRAMAA*

*Regulations for Clearances and  
Works in the Vicinity of  
Extra-High Voltage  
Installations*

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## **PART ONE**

### **1. Introduction**

These Regulations are issued by KAHRAMAA (KM) under the authority established by the Emiri Decree 2000.

These Regulations were last updated on 6 February 2007.

There is no expiry date for these Regulations other than subject to amendments by KAHRAMAA.

### **2. Purpose**

The purpose of the regulations is to:

- Minimize the human cost to individuals, families and the general public of death, injury and destruction that can be caused by electricity;
- Prevent damage or interference to KAHRAMAA's extra-high voltage (EHV) installations;
- Ensure safe and continuous supply of electricity.
- Ensure safe working practices by any person while working in the proximity of KAHRAMAA's EHV installations.

The regulations are binding for entities, employers, employees, workers and persons in the vicinity of KAHRAMAA's EHV installations.

The Regulations stipulate the conditions for execution of private and public services work in the vicinity of EHV electricity installations.

### **3. Responsibilities & Authorities**

KAHRAMAA is the responsible and authority body for the enforcement, interpretation and update of these Regulations. The KAHRAMAA representative to be contacted for all matters relating to these regulations is Electricity Networks Affairs - ENA.

### **4. Definition of Terms**

**EHV** Extra High Voltage, Covers voltage over 33kV.

**ENA** Electricity Network Affairs, KAHRAMAA

**KM** KAHRAMAA, Qatar General Electricity and Water Corporation

<b>OHL</b>	Overhead Transmission Line
<b>RO</b>	Road Opening
<b>ROW</b>	Right of Way /Way leave/Reservation
<b>SIS</b>	Services Information Sheet
<b>vicinity</b>	Means a situation where there is a reasonable possibility of a person, either directly or through any conducting medium, coming closer than the relevant approach distances specified in this Regulations or if not specified, the person is at risk of endangering his/her safety or damaging KAHRAMAA assets.

## **5. Articles**

### **Article (1)**

To issue this circular under the titled subject "***KM Regulations for Clearances and Works in the Vicinity of Extra-High Voltage Installations***" with the aim of notifying all authorities, persons, organizations and government bodies which carry out the supervision and execution works for Public Services on roadways, public places to conform with the requirements provided in their plans and relevant methods of execution in case these works interfere or affect the present and future EHV electricity installations.

### **Article (2)**

All Ministries, Government Departments and Bodies, Organizations, Entities and persons concerned must comply strictly with the contents of the documents detailed in this circular, copy of which are available in both Arabic and English languages. Also all those concerned must distribute this circular to all Directors of Projects, Consultant and Contractors currently engaged by them or those prospective contractors.

### **Article (3)**

Any questions on the contents of the circular can be directed to Electricity Networks Affairs, KAHRAMAA.

## PART TWO

### ESTABLISHING TEMPORARY OR PERMANENT INSTALLATIONS IN THE VICINITY OF EXTRA HIGH VOLTAGE (EHV) ELECTRICITY PLANT

#### Introduction

This provides rules for planning and construction of roadways, pipe-lines, buildings, structures and other works in the vicinity of high voltage installations of KM. These rules cover the following High Voltage Transmission Installations:

- a. Overhead lines: 400 kV, 220 kV, 132 kV, 66 kV & 33 kV
- b. Cable installations: 400 kV, 220 kV, 132 kV, 66 kV & 33 kV (including associated pilot and Fiber Optic cables either laid alongside of power cables or laid independently without power cables)
- c. Primary substations: 400 kV, 220 kV, 132 kV, 66 kV & 33 kV

All activities in the vicinity of EHV installations shall be subject to prior approval of ENA, of KM. The compliance with these rules alone does not absolve the responsibility of the concerned party from obtaining the necessary approvals from the concerned section of KM & other state departments. Approval of such works to the Contractor shall be in the form of Service Information Sheets (SIS) supported by relevant documents as per the procedures, prior to the establishment of any work within the boundary limits and time period as described therein.

For any queries related to the EHV installations, please contact ENA, Planning Department for existing record drawings and for future proposals. Issue of SIS will be issued by the Transmission Department.

### **1. Overhead Lines**

#### **1.1 General Requirements & Definitions**

- 1.1.1 KM has the right of way (ROW) of 25 meters for 33kV/66kV/132kV, 50 meters for 220kV and 400 kV (mandatory requirements) widths on either side of the centre line of overhead transmission lines unless otherwise defined for specific locations. Right of the way for transmission lines operating at voltages other than these levels will be advised when such are added to the system.

- 1.1.2 Other than the roadways and boundary fences of security establishments any temporary or permanent structures / buildings, parapet walls, etc. shall not be permitted within the above way leave limits. With regard to services crossing the way leave they should be under-grounded and kept 25 meters (minimum) away from the nearest tower foundation of 33kV/66kV/132kV, and at minimum 35 meters for 220kV / 50 meters for 400kV respectively for overhead lines.
- 1.1.3 The nearest side of the road reservation to the nearest tower foundation shall be at-least 25, 35 and 50 meters for 33kV/66kV/132kV, 220kV and 400kV overhead lines respectively.
- 1.1.4 The pipelines (water, oil/gas etc.) crossing the way-leaves of 33kV/66kV/132kV,220kV and 400kV shall be 25, 35 and 50 meters (minimum) respectively away from the nearest base of tower leg. Where it is not feasible to avoid parallel running of the metallic pipelines, cables and fences with the overhead lines within the way-leave or outside, in specific and special cases, KM ( Director ,ENA ) shall accord the approval only after establishing that responsible authorities shall comply with KM requirements to counter the detrimental effects of their services or infrastructure on overhead lines and vice versa, proven by measurements and calculations that the interference effects are within permissible limits. Pipe lines cathodic protection should not adversely affect any KM installations such as O/H Lines Pylon foundations and earthing. All pipe lines shall be under grounded within the OHL defined way leave (ROW).
- 1.1.5 The use of OHL way leave (ROW) as a road or vehicle track is not allowed. Dumping of rubbish is prohibited within the limits of way leaves and it is the Government rule “Not to tip rubbish except in allocated areas”.
- 1.1.6 All excavation within the way leave shall be backfilled and compacted to withstand the loads of maintenance machinery having a G.V.W of up to 36tons. All excess material shall be removed and, surface reinstated to the original condition to permit free access of maintenance vehicles/machinery as above. The backfilling shall be carried out as per the Civil Engineering Standards followed by the Public Works Authority (PWA) for back filling and compaction. A compaction certificate shall be obtained by the contractor from the approved laboratory/consultant and shall be submitted to Transmission Department of KM along with the completion certificate and As-Built Drawings/Documents for the work with in the OHL way-leave (ROW) duly signed by the client, consultant and the contractor and stating that KM requirements are completed with the provisions of circular no.6 (revised) in accordance to checklist Form provided by KM

1.1.7 Two weeks prior to the commencement of any work within the way leave, the contractor shall advise KM Transmission Operation & Maintenance Section (Transmission Department) and obtain a Service Information Sheet (SIS) (where the relevant procedure of Transmission Department shall be strictly followed) from the Head of Transmission O & M Engineer. The Transmission Department reserves the right to stop any construction activities within the way leave limits, in the absence of Service Information Sheet or works which are carried out in a manner contrary to the instruction given in the Service Information Sheet or have not obtained the necessary approval of the appropriate KM Department as required under different clauses of the regulation.

## **1.2 Roadways**

The construction of roadways shall conform to the guidelines as detailed in Para 1.2.1 to 1.2.6

1.2.1 The finished road surface shall have a specific minimum clearance (mandatory requirement) below the bottom conductor of overhead line, under the designed operating conditions. Such clearance depends on the line voltage and other design parameters.

Direct height measurements at site are misleading, as the height of the conductor along the profile would vary considerably when operating at maximum design temperature. The Transmission Department (ENA) of KM shall, therefore, be consulted to obtain the design values to each individual case and the applicable minimum clearance.

1.2.2 The nearest side of the road to a tower foundation shall make allowance for installation of crash barriers, if so required which should not be less than 25 m from the nearest point of the tower foundation.

1.2.3 Free access from the road-ways to the maintenance tracks shall be provided. The access shall be properly ramped & compacted to suit the maintenance vehicles having a G.V.W of up to 36 tons. Barrier gates shall also be provided as required.

1.2.4 Guard wire and poles of approved type, strictly in accordance to KM standard drawing and specification, shall be erected by the contractor at 75 meters ahead of the crossing point of the line. The poles shall be galvanized and painted over

with red & white strips. The Red and White paint shall be of reflective florescent type. Guard wire height shall be based on 3m, 4m and 5m clearances below the level of the lowest conductor under rated operating conditions for the 33Kv/66kV/132kV, 220kV and 400kV overhead lines respectively.

The guard wires carrying approved type warning shall be strung across the roadway at the above mentioned minimum clearance (mandatory requirement) below the level of the lowest conductor under rated operating conditions/temperatures. Every installation shall be subject to prior approval of the Transmission Department (ENA) of KM.

- 1.2.5 Guard wires / poles shall be erected by the contractor prior to the establishment of any work within the 25, 35 and 50 meters way leave limits for 33kV/66kV/132kV, 220 kV and 400 kV respectively..

Use of heavy construction equipment such as bucket, excavators, mobile boring equipment, cranes, etc... Having extendable arms with longer reach is not permitted within the way leaves for safety reasons.

- 1.2.6 The roadways shall be designed to run with minimum interference to the overhead lines (preferably perpendicular to the line when crossing). Construction of roundabout or part thereof or T-offs or road junctions within way leave (ROW) limits is not permitted.

### **1.3 Pipe-lines**

- 1.3.1 Pipe-lines shall not be laid parallel to the overhead line within the limits of a way leave (ROW).

- 1.3.2 All pipes within the way leave shall be buried and adequately protected against weight of heavy maintenance machinery used for overhead lines having G.V.W of up to 36 tons. If cathodic pipelines protection is necessary, then the design of such protection should not affect O/H Lines foundations and Earthing systems and shall not interfere with the protection systems of transmission lines. .

- 1.3.3 Pipe-line crossing the 33kV/66kV/132kV, 220kV and 400kV transmission lines way leave (ROW) shall be 25, 35 and 50 meters (minimum) respectively away from the nearest base of tower leg...

### **1.4 Boundary Fences**

- 1.4.1 Boundary fences shall not be laid parallel to the overhead line within the limits of a way leave (ROW). The safe distance for proposed fences running parallel to

the transmission overhead lines shall be proved for safety by calculations, by contactor or their consultants.

- 1.4.2 Where necessary, fences running parallel to the transmission lines or crossing the way leave (ROW) of lines shall be earthed using appropriate means to avoid any electrical accidents while working on the fences.
- 1.4.3 Access gates without horizontal top beams shall be provided at the points of crossing of way leaves.
- 1.4.4 Free access for the maintenance staff shall be provided / arranged on day and night basis.

### **1.5 Gardens & Landscaping**

Development of gardens, planting of trees, etc. within the limits of way leaves shall be prohibited.

### **1.6 Street Lighting**

Street Lighting columns and over head wires are not permitted within the way leave. Where due to lighting and traffic safety requirements the street lighting columns are essential within the overhead lines way leave (ROW) , in specific and special cases, KM (Director, ENA) shall accord the approval only after establishing that no other alternatives are practicable and that responsible authorities shall comply with KM requirements .

### **1.7 Installations of Plant Outside the Way leave which May Influence EHV Services**

- 1.7.1 Firing ranges shall be located well away from the electrical installations (transmission lines and substations) such that it shall not impose any danger to the personnel and the installations of the department.
- 1.7.2 Ammunition stores shall be located well away from the installations such that accidental casualty to the stores shall not cause any damage to the EHV installations.
- 1.7.3 The radar and similar radiating installations shall be located at a distance such that the level of radiation at the site of KM installations is within the acceptable limits to ensure safety of personnel & avoid mutual interference between both installations.
- 1.7.4 High structures whether temporary or permanent are not permitted to be constructed within its falling distance + 5 meters from the nearest O/H line conductor deflection with "full wind" design conditions.

1.7.5 HV or EHV cables shall not run parallel to the EHV overhead lines within or outside the OHL way leave. Where due to specific site conditions and technically justified reasons, the parallelism is unavoidable; KM (Director, ENA) shall accord the approval after establishing that no other alternatives are practicable and that responsible authorities shall comply with KM requirements. The Project contractor / consultant shall study the impact of such parallelism of cables with OHL and vice versa and shall prove by calculations that it is safe to lay the cable along the propose cable route. Cables crossing the 33kV/66kV/132kV, 220kV and 400kV transmission lines way leave (ROW) shall be 25, 35 and 50 meters (minimum) respectively away from the nearest base of tower leg.

### **1.8 Passage of High Loads under the OH Lines:**

The Transporter or the end user of transported goods shall check the height of the cargo that could be transported safely under the lines in consultation with the O&M (Transmission) section of Transmission department of KAHRAMAA. Head of O&M (Transmission) section shall be notified minimum 14 days in advance about the proposed movement of "High Load" under the line(s) enabling them to study the feasibility. The end user/transporter shall provide all assistance and support to facilitate safe passage of the loads. Necessary co-ordination between different departments and other utilities / law enforcing agencies shall be carried out by the end user.

## **2. Cable Circuits**

### **2.1 General Requirements & Definitions**

- 2.1.1 This heading covers all types of EHV cables (Power, Pilot, Telemetry and Fiber Optic) which are installed beneath the ground level.
- 2.1.2 Typically, the cables are 'off road' installations, except at road crossings where the cables are inside concrete ducts filled with bentonite. There are few exceptions where some of the cable circuits are allowed to remain along the extended carriageway with certain conditions by prior agreement.
- 2.1.3 The cable routes shall be free of any permanent temporary structures. KM reserves its right to excavate along the cable route for necessary repair works.
- 2.1.4 Cables are normally buried directly in the ground in trenches located as per applicable Road Hierarchy or inside open ground in the dessert i.e.; inside the carriageway, under the payment, across the road, inside ducts, or in the dessert. Wherever cables have been laid or installed, KM has the ROW along the cable routes; the horizontal width of the ROW is generally 1 to 4 meters depending on the installation arrangement.

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- 2.1.5 Although KM can furnish reasonably accurate drawings/records of the routes of these cables the responsibility of positively ascertaining the location and depth of a cable rests with the parties involved with the works at the vicinity of the cables.
- 2.1.6 Usually, KM Data Base maintains records of cables installed in the ground. The records are reasonably accurate but, not a guarantee of the precise location and depth of the cable. It is possible that some cable circuits have not been entered in the records or that they are in the process of being entered in the records.
- 2.1.7 The existence of EHV cables beneath the ground shall be ascertained by taking trial holes over the cable route, without depending on the available records.
- 2.1.8 Usually, the cables are buried such that the average depth from the ground level to the top of the cable protective tile is 1.1 meters. The location of the cable along the route is usually identified with cable route markers but, the accuracy of information is not guaranteed as it is possible that the cable route markers may have been shifted by others without approval of KM.
- 2.1.9 Within the cable reserves no excavation will be allowed except for the crossing of other services e.g. telephone lines, pipe-lines or to make trial holes for the positive identification of the cable.
- 2.1.10 Excavations parallel and very close to the cable route but, outside the ROW will be allowed only if the total length of traverse is not more than 500 m and that there is no danger to the existing installation from collapse. Where the proposed new service very close to the route extends for more than 500 m, the concerned utility shall produce induced voltage calculations to confirm that there installation is safe from Induced voltages and Step & Touch voltages.
- 2.1.11 Foundations and civil structures (Temporary or permanent) will not be permitted in the close proximity to the cable circuit. A minimum horizontal distance of 1.5 m from such structures to the nearest edge of the cable trench shall be observed provided that excavations for such structures are not deeper than the bottom level of the cable trench. For deep excavations below the level of cable trench, advice of KM shall be sought to establish the horizontal distance that could be permitted.
- 2.1.12 Any posts of the fences and sign boards crossing the cables way leave should be erected outside the way leave limits.
- 2.1.13 KM shall be informed of all the development works which involve the cable reservation and specific approval shall be obtained prior to detailing any works in these areas. The Operation and Maintenance (O&M) Section of Transmission Department shall be informed 14 days prior to commencement of

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any excavation work in the vicinity of cables and necessary Service Information Sheet (SIS) /Clearance shall be obtained.

- 2.1.14 The use of mechanical excavators shall not be permitted for excavation work approaching three meters to the cable reservations and within ROW. All excavations shall be done manually. Limited use of jackhammer under direct supervision may be allowed by KM.
- 2.1.15 Excavation approaching three meters to ROW and deeper than 1.1 meters shall be protected by shuttering to prevent collapse of soil protecting the cable circuits.
- 2.1.16 The excavation Contractor shall provide a competent person (approved by KM) at site at all times to receive the instruction from the representative of KM concerning requirements to safeguard the integrity of the cables.
- 2.1.17 Removing Cable protective tiles and exposing the cable installation is not allowed unless the Contractor has been served with a Safety Document as per the rules and regulations of KM supported by an approved method statement concerning the procedure protecting the cable installation. The exposed cables shall be normalized exactly to the original condition. Usually, the cables are embedded in dune sand or inside stabilized backfill below the cable tiles. The bedding below the cable tiles, installed cable tiles, backfilling and reinstatement above the cable tiles shall be supervised by an authorized person on behalf of KM. Any dislocated cable route markers shall also be reinstated.
- 2.1.18 Any damage to the installation will be subject to a claim for reimbursement of cost of repairs including the consequential loss against the contractor.
- 2.1.19 When the cables are running parallel to the EHV OH lines or crossing them the necessary impact of fault on lines and vice versa shall be studied and provided to Kahramaa before commencing any excavations.
- 2.1.20 The Explanatory notes concerning EHV Cable installations as set out in Appendix 6 of this document is supplementary and shall be complied with.

## **2.2 New Roadways**

- 2.2.1 Cable reservation is either provided along the central reservation or the edge of the roadway. The development of existing roadways in some cases has encroached the cable reservations. In such cases the existing cables shall be diverted and rerouted as off road installations free of cost to KM. System outages for such works shall be between 01<sup>st</sup> of November to 30<sup>th</sup> March of the following year subject to prior agreement with KM.
- 2.2.2 Where KM has agreed to keep to cables under the extended carriageway, KM reserves the exclusive right of excavation of even newly laid road for repair

works, if this becomes necessary. Any future revision to the existing Road Hierarchy must comply with KM reservation and corridor requirements and shall obtain prior approval of KM.

- 2.2.3 At all crossing points of roads & cable reservations, approved type and number of cable ducts shall be provided for future cable circuits. Spare cable ducts shall also be provided at the existing cable crossing points.

### **2.3 Telephone, Water, Sewerage & Gas Services**

The service facilities for telephone, water, sewerage, gas, etc. shall not be permitted to be laid within the cable reservations. The following minimum clearances shall be observed for respective service lines at crossing points. Such crossings may not be permitted if the cable's rating / integrity will be affected in any way by the services to cross the cable reserve.

<b>Service/Utility</b>	<b>Vertical clearance (Minimum)</b>
Water & TSE Mains (to cross below EHV cable level)	500 mm
Water distribution lines	200 mm above cable protective tile
Sewerage Mains (to cross below EHV cable level)	1000 mm
Drainage	500 mm below the cable or 200 mm above the cable protective tile
Gas pipes	600 mm
Telephone lines	200 mm above the cable protective tile
LV / 11kV cables	150 mm above the cable protective tile

### **3. Substations**

- 3.1 The current building permits regulations regarding minimum set back distances from neighbor's boundaries should be complied with for adjacent premises. At present a 3.0 m set back is required from the substation boundary lines fixed at the approved site co-ordinates lines.
- 3.2 The design of dwellings and commercial building shall take into consideration that harmful objects are not thrown into the substation or exhaust from dust extractors etc. discharged in a manner which may cause serious damage or pollution to the EHV installations.
- 3.3 Prior to commencement of construction work in proximity to the outdoor high voltage installations, necessary safety measures, shall be observed.

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- 3.4 KM substation entrance shall be kept clear all the time where no car parking is allowed near or around the substation .In neighborhood of KM installation dumping of scrap/rubbish or storage of dangerous materials (gas/explosives) or Building of High Rise Multi-story building over looking the substation or utilization of open space for sports activity shall be strictly prohibited.

### **4. General Liabilities**

- 4.1 It is the responsibility of the authorities installing other services to ensure that no detrimental effects are encountered due to proximity of EHV installations (e.g. effects of induced voltages, cathodic protection, interference with T.V. & Radio reception etc.).
- 4.2 No work which may cause pollution or other detrimental effects to KM installations is permitted in the proximity of EHV services.
- 4.3 The contractor shall indemnify the KM against accidental injury or death to their personnel working in the proximity of live installations. It is the responsibility of the contractor to ensure that proper safety measures are taken by their personnel working in the proximity to EHV installations.
- 4.4 The above guidelines do not negate the need to carry out the Road Opening Procedures or any other procedure requested by other sections of KM or any other departments for the same other reason.
- 4.5 Neither these guidelines nor any information gathered from any other official source will absolve liability for damage.
- 4.6 As-Built Drawings would require to be submitted to KM for location of Road crossing ducts, Diversion or Relocation of EHV /HV installations to up-date KM records.

## Appendix A

### EXPLANATORY NOTES CONCERNING EHV CABLE INSTALLATIONS

Wherever the existing cable installations may be affected by the proposed development work, the requesting authority shall make an application to KM for *Service Information Sheet* (SIS) and carryout initial investigations by taking *Trial Holes* along the EHV cable route to ascertain the exact position of cables and the depth to the top of cable cover. The investigation should generally be undertaken prior to the award of Contract by the concerned Authority.

In the event EHV installations are within the proposed development work the requesting authority shall examine alternative options and ensure that the existing installations are unaffected. Where this is not possible, EHV cable installation shall be diverted and re-routed. The funds for such additional works shall be met from the concerned Service Authority unless KM agrees to meet the expenditure.

Where the existing installations will not be affected the work may proceed with the consent of KM and upon completion of works the concerned authority shall submit as built drawings 1:500 scale showing precisely the modifications with respect to EHV cable installations marked to scale in Soft Copy and Hard copy formats acceptable to KM, GIS Data Base Section. The characteristic points shall have 1:20 scale therein.

The following requirements are complementary to those already stipulated as above and shall be satisfied as a minimum for any activity within the vicinity of EHV installations.

1. After the preliminary investigations, detailed drawings shall be submitted on 1:500 scale drawings showing the precise location of other services and the proposed development works with respect to existing EHV installations superimposed on single sheets.
2. KM shall have the right to excavate within the cable reservation, be it new roadways, pavements, walkways, roundabout, centre reservation etc., and remove any obstruction whatsoever at any time should it be necessary to attend to cable repair and maintenance.
3. Where the line of the proposed carriageway/hard shoulder infringes on existing cable installation which has hitherto remained as an *off road* installation, and where the depth from final surface level to the top of the cable cover is not more than 1.1 m over a length not exceeding 10 m of every 100 m of cable route, suitable RCC raft protection may be installed with the consent of KM. The proposed raft protection shall incorporate the following requirements and the proposed installation details and methodology shall be submitted to the Department for review.
  - 250 mm wide with suitable lifting facility

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- Capability of withstanding 10 Ton wheel load
  - Vertical opening of 100 mm diameter exactly above the cable to facilitate testing of cable. This shall be at every 1 m intervals along the length of cable.
  - The length of the raft extending 0.5 m beyond each outside edge of cable tile.
  - 200 mm dune sand bedding between the top of cable tile and bottom of raft protection.
4. In the event of widening of the road (or part thereof), the cable ducts of the existing road crossings shall be extended to cover the increased area falling under the new road including a length of 0.5 m beyond the furthest edge of the proposed curb line on each side of the extended carriageway/road crossing. Split ducts shall be used for the existing cables, which shall be filled with *BENTONITE Mixture* after installation. All the ducts shall be sealed with caps to prevent the migration of contaminants inside the ducts. The work shall be co-ordinated and carried out with the approval of the Department.
  5. Spare ducts shall be constructed at road crossings.
  6. Wherever, roundabouts are proposed over the line of sight of existing cables, such sections of cables shall be re-routed to fall under a Footpath/ pavement of the outside edge of the roundabout.
  7. Delineation Bollards/Vehicle barrier posts shall be erected at locations close to valve pits, tank pits to prevent trafficking from vehicles.
  8. Constructions such as water gullies, soak pits, chambers, water mains, high mast foundations, Traffic signal control equipment, Traffic Radar Cabinets shall be located one meter away from the nearest edge of cable protective cover, Tank pit or cable joint bay.
  9. Use of heavy mechanical excavators (other than hand operated pneumatic jack hammers) or driving sheet piles within 3m reach of the nearest edge of cable cover, cable joint and tank pits are not permitted.
  10. Heavy machinery engaged in the civil construction or road works shall be located in such a manner that the operating load/thrust/weight will not be applied directly on the cable installation.
  11. Trench excavations parallel to the cable installations shall have a minimum separation of 1.0 m to the nearest edge of cable tile. Only 30 m of trench shall remain open at any time unless suitable shoring, timbering and shuttering are provided acceptable to KM, to protect the EHV installation and the cable from collapsing.

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12. Laying of metal pipes over a long distance parallel to cable in close proximity is not permitted unless the concerned authority satisfies that the *Step and Touch Potentials* at any point of the pipe line do not exceed 65 Volts.
13. Temporary access or approach roads so required for diversion of vehicular traffic during the progressive stages of construction works, which falls over the cable installations shall be subject to limitations noted under (4) above.
14. The hard surface, if any, falling above the cable installation shall be loosened by pneumatic jack hammers or similar machinery prior to scooping out the debris to prevent the transmission of vibration to the cable installation below.
15. Where the requirement of other services, such as water mains, telephone, sewerage mains etc. necessitate the crossing of EHV installations, prior approval of KM shall be obtained for the precise location and the method of crossing. Where the proposed services shall cross under, the EHV cables shall first be exposed and temporarily protected in a manner acceptable to KM. Such protection measures shall be made with the cables switched off for which purpose 14 days notice will be required. In the event KM is unable to arrange the outages as requested, such reworks shall be programmed during the period spanning from 01<sup>st</sup> November to 30<sup>th</sup> March of the following year when the plant can be conveniently taken out of service.
16. Work within the EHV reservation shall be continuously supervised by the authority or the Consultant engaged in the proposed development work. However, if it becomes necessary to disturb the cable installation or expose the cables such works shall be carried out only after obtaining necessary *safety documents*.
17. Continuous interaction shall be maintained by the authority or the consultant with KM as the work progresses in order to ensure highest safety and security to the integrity of EHV installation(s).

- END -