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15 IMPACT FROM ELECTRIC AND MAGNETIC FIELD

15.1 Introduction

15.1.1.1 This section presents the assessment on the potential impact from exposure to electric and magnetic field generated from the overhead electricity cables. The assessment on impact from electric and magnetic field has been conducted in accordance with the requirements in Section 3.4.15 of the EIA Study Brief (ESB-363/2023).

15.2 Environmental Legislation, Standards and Guidelines

International Commission on Non-ionizing Radiation Protection

15.2.1.1 Guidelines on limits of exposure to electric field (ELF) and electro-magnetic field (EMF) were issued by the International Commission on Non-ionizing Radiation Protection (ICNIRP) in Year 1998 [1]. The guidelines were updated in Year 2010 [2] and were recognised by the World Health Organization. According to the ICNIRP (1998) guidelines, ELF and EMF generated from the overhead cables shall comply with the limits stated in **Table 15.1**.

Table 15.1 Guidelines on Limits of Exposure to 50 Hz Power Frequency Electric and Magnetic Fields Issued by ICNIRP

Exposure Characteristics	Electric Field Strength, V/m (1)	Magnetic Flux Density, μT (1)
General Public Continuous	5,000 (2)(3)	100 (2) 200 (3)
Occupational Continuous	10,000 (2)(3)	500 (2) 1000 (3)

Notes:
(1) Unperturbed root-mean-square (rms) values.
(2) The standards stipulated in Guidelines following the ICNIRP (1998) limits for 50 Hz electric and magnetic fields.
(3) The standards stipulated in Guidelines following the ICNIRP (2010) limits for 50 Hz electric and magnetic fields.

Hong Kong Planning Standards and Guidelines

15.2.1.2 As stated in Clause 2.3.10 of Chapter 7 of the Hong Kong Planning Standards and Guidelines (HKPSG), the EMF exposure limits promulgated in the guidelines issued by ICNIRP in 1998 are adopted. The relevant standards are presented in **Table 15.1**.

15.2.1.3 As the ICNIRP (1998) guidelines on magnetic flux density are more stringent than that in the ICNIRP (2010), the ICNIRP (1998) guidelines was adopted as the assessment criteria in this Study as a conservative approach.

15.3 Identification of Potential Impacts

15.3.1.1 ELF and EMF are present everywhere in our environment. ELF is generated by difference in voltage. The higher the voltage, the stronger the resultant ELF will

[1] International Commission on Non-Ionizing Radiation Protection, Guidelines for limiting exposure in time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz). Health Phys. 74:494-522; 1998.
[2] International Commission on Non-Ionizing Radiation Protection, Guidelines for limiting exposure in time-varying electric and magnetic fields (1 Hz - 100 kHz). Health Phys. 99(6):818-836; 2010.

be. EMF is created by electric current. The greater the current, the stronger the EMF will be. ELF and EMF are produced by virtually all electrical consumer appliances, computer terminals, wiring in homes, offices and power lines.

15.3.1.2 A portion of the 400 kV overhead cables of approximately 350 m long is located within the Development Area near Ching Yau Road and Wang Ping Shan South Road. The areas within the Development Area underneath the overhead cables are currently zoned as Green Belt and Comprehensive Development Area (**Figure 15.1** refers). These areas are largely occupied by open storage areas and villages. Residents in these areas, as well as workers in the open storage areas and brownfield sites, may be exposed to ELF and EMF associated with the overhead cables to varying degrees.

15.3.1.3 The overhead cable and associated pylons are situated near / at the southern and eastern portions of the Development Area (**Figure 15.1** refers). As such, the potential ELF and EMF impacts to the proposed developments at these portions of the Development Area were assessed. According to the Recommended Outline Development Plan (RODP), the proposed land uses of Development Area under/in the vicinity of the overhead cable are presented in **Table 15.2** and illustrated in **Figure 15.1**.

Table 15.2 Proposed Land Use under / in the Vicinity of the 400 kV Overhead Cable

Proposed Land Use		Approx. Horizontal Distance between the Proposed Land Use and 400 kV Overhead Cable, m
Site ID	Land Use	
OU(RDCRD).1(1)	Other Specified Uses (Railway Depot with Commercial / Residential Development)	0
A.5(2)	Amenity	0
A.6(2)		0
OU(RF).1(2)	Other Specified Uses (Railway Facility)	8
GB.2	Green Belt	61
G.5(1)	Fire Station Cum Ambulance Depot	8
G.8	Integrated Hospital	72
G.9(2)	Electricity Substation for the Integrated Hospital	80
G.11	UniTown	72
G.12		48
G.13(3)	Government, Institution or Community	12

Notes:
(1) The proposed buildings, which would be subject to continuous exposure of ELF and EMF, would be situated at no less than 31 m away from the existing 400 kV overhead cables.
(2) Occupants of this land use are transient in nature and therefore continuous exposure of ELF and EMF is not expected.
(3) The land use and building layout at Site G.13 is not available in the preparation of this assessment.

15.4 Evaluation of Potential Impacts

15.4.1.1 In assessing the electric and magnetic field impact arising from the existing 400 kV overhead cables, reference was made to two approved EIA reports, namely Development at San Hing Road and Hong Po Road, Tuen Mun (Register No.:

AEIAR-227/2020) (SHR & HPR EIA report) and San Tin / Lok Ma Chau Development Node (Register No.: AEIAR-261/2024) (STLMC DN EIA report). Given that the strength of ELF and EMF depends only on the voltage and distance from the sources, both of these approved EIA reports provide valuable measurement results for assessing the potential ELF and EMF impact from the 400 kV overhead cables. It is worth noting that the existing 400 kV overhead cables near / at the Development Area are exactly the ones assessed in the approved STLMC DN EIA report.

15.4.1.2 According to the approved SHR & HPR EIA report, the maximum ELF measured directly underneath the overhead cables was 288 V/m (rms), while the magnetic field peaked at 4.88 μT (rms). Similarly, the approved STLMC DN EIA report documented a maximum electric field of 198 V/m (rms) and a magnetic field of 1.40 μT (rms) were measured directly underneath the overhead cables. ELF and EMF measurements in both EIA studies were carried out in accordance with the ELF and EMF standards stipulated in Chapter 7 of the HKPSG and the ICNIRP (1998) guidelines. Notably, the measured ELF and EMF values in both approved EIA reports are only a few percentage of the exposure limits set out in the ICNIRP (1998) guidelines.

15.4.1.3 This consistent observation across two separate EIA studies strongly indicates that the electric and magnetic fields generated by 400 kV overhead cables are well within safe and acceptable exposure standards, even at locations direct underneath the cables. According to the RODP, although few sites will be directly beneath or in proximity to (i.e. less than 10 m) the existing 400 kV overhead cables, the proposed buildings within Sites OU(RDCRD).1 and G.5 will both be situated at no less than 31 m away horizontally from the overhead cables, while no continuous exposure is anticipated at Site A.5, Site A.6 and Site OU(RF).1 in view of transient use of occupants of these sites. For Site G.13 where continuous exposure is expected, the entire site will be situated at no less than 12 m horizontally away from the overhead cables. Based on the findings as discussed in **Section 15.4.1.2**, it is anticipated that the existing overhead cables would not pose adverse electric and magnetic field impact to the Development Area.

15.5 Mitigation Measures

15.5.1.1 No adverse impact due to exposure to ELF and EMF from existing 400 kV overhead cables is anticipated. Thus, mitigation measure is deemed not necessary.

15.6 Evaluation of Residual Impacts

15.6.1.1 No residual impact due to exposure to ELF and EMF from existing 400 kV overhead cables is anticipated to the Project.

15.7 Environmental Monitoring and Audit

15.7.1.1 No adverse impact due to exposure to ELF and EMF from existing 400 kV overhead cables is anticipated to the Project. Thus, environmental monitoring and audit is deemed not necessary.

15.8 Conclusion

15.8.1.1 According to the RODP, the existing 400 kV overhead cables are situated near/at the southern and eastern portions of the Development Area. Based on the measurement results in previous EIA studies, the ELF and EMF generated by the existing 400 kV overhead cables, even at the area directly underneath the overhead cables, were only a few percent of the general public and occupational exposure standards stated in **Table 15.1**, which are well below the stipulated limits in the ICNIRP (1998) guidelines. Hence, it is expected that the existing 400 kV overhead cables located within/in the vicinity of the Development Area would not pose adverse impact on the proposed developments of the Project.