C-INTECH 176 BULLOCK DRIVE, #10 MARKHAM, ON L3P 7N1 TEL.: 905-472-3949 FAX: 905-472-8076

EMF MANAGEMENT PLAN

Pertaining to:

3400 DUFFERIN STREET
Toronto, ON

Prepared for:
COLLECDEV
20 Eglinton Ave. W. Suite 1700
Toronto, ON
M4R 1K8

Prepared by:
Amanda Jeffs

August 6th 2022

W.O. #: 169937

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TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Site Description

This land is presently occupied with an operating Honda dealership & auto repair center, located in the center of the property. Toronto Hydro distribution lines run South of the property, along Jane Osler Blvd. A North York Hydro vault is located along the East property line, beside Dufferin Street.

1.2 Intended Site Usage

The proposed mixed-use site development includes 3 buildings, ranging from 4-29 storeys.

1.3 Purpose of this Study

In accordance with City of Toronto's Prudent Avoidance Policy, the purpose of this electromagnetic field (EMF) Site Survey is to determine the actual level of magnetic field from all sources in occupied areas.

Present and probable future scenarios are evaluated to quantify the magnetic field exposure and outline the mitigation measures required, if any.

The survey readings are superimposed on the site plan for easy correlation and assessment of any magnetic field interference.

2.0 ELF MAGNETIC FIELD SURVEY

2.1 Testing Methodology

The electromagnetic field survey was carried out on Tuesday August 2nd, 2022 between the hours of 10:00 a.m. and 11:30 a.m.

The readings were taken at regularly spaced locations over the entire property considered for development. The entire site was surveyed at the standard height of 3ft above grade, in accordance with the relevant parts of IEEE standard 644-94.

The readings were recorded onto the site plan next to the location of the measurement, marked with a cross.

Additional readings were taken across the City of Toronto distribution lines in order to evaluate individual line contributions to the overall field levels.

2.2 Testing Instrument

The testing instrument for this survey was EMF/ELF Meter Model TM-192D manufactured by TENMARS. This instrument is a handheld triaxial magnetic field meter with frequency response from 30Hz to 2000Hz. It is calibrated to match the power frequency.

2.3 Sources of Magnetic Field

2.3.1 The most significant source of A.C. magnetic field at the time of this survey was the North York Hydro Vault located along the East property line, beside Dufferin Street. See Photo #1, #2 & #3.

2.3.2 An external transformer, located in the center of the North perimeter of the property, was also a source of A.C. magnetic field. See Photo #4.

2.3.3 Toronto hydro distribution lines run South of the property, along Jane Osler Blvd. Due to their sufficient distance from the property, they are not a potential source of radiated A.C. magnetic field onto the property. See Photo #5.

2.4 Findings

2.4.1 Readings taken within the proposed residential tower & townhouse footprints ranged from 0.1mG to 0.2mG, 3ft above grade.

2.4.2 As displayed in Drawing S-169937-01, the A.C. magnetic field readings varied throughout the property with a notable increase within close proximity to the North York Hydro vault. See Photo #2.

2.4.3 The Toronto Hydro distribution lines South of the property along Jane Osler Blvd are located a sufficient distance from the property line, that their magnetic field impact onto the development is minimal.

A.C. magnetic field from the Toronto Hydro distribution lines decay with distance more rapidly than transmission line current generated fields (with square of the distance). As a result, they affect a smaller area.

2.4.3 The results of their combined magnetic field, at actual load during the time of the survey at 1m height, are displayed in Drawing S-169937-01.

3.0 EMI INTERFERENCE LIMITS

3.1 Canadian Standards

3.1.1 Presently, there is no Canadian standard governing human exposure to extremely low frequency fields. Health and Welfare Canada has adopted guidelines provided by the American Conference of Governmental Industrial Hygienists (ACGIH) and World Health Organization (WHO).

3.1.2 The City of Toronto's "Prudent Avoidance Policy" is based upon an international review of childhood leukemia studies by the World Health Organization, which found a possible increased risk for long term average exposures above 3-4mG. The City has adopted a policy which encourages limiting children's exposures to magnetic field with a particular focus on children under 12.

3.2 American Conference of Governmental Industrial Hygienists (ACGIH)

3.2.1 ACGIH publishes Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices in an annual publication.

3.2.2 The exposure limit for sub-radio frequency magnetic fields is frequency-dependent: for 60 Hz (fundamental power frequency), the exposure limit is 1mT (10,000mG). This limit is reduced to 0.1mT (1,000mG) in the "Notes" to accommodate people with cardiac pacemakers and other metallic medical implants.

3.3 World Health Organization (WHO)

3.3.1 The WHO adopts guidelines put forth by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The exposure limit for the power frequency (60 Hz) magnetic field is given by the formula provided in table 7 (see Appendix 1) and is graphically displayed in Fig. 2. (For 60 HZ, the limit for the general public is 833mG.)

NOTE:

Both ACGIH and WHO (ICNIRP) limits are based on the same principle of interaction of the magnetic field with living tissue. The mechanism of the interaction is primarily thermal, as a result of the induced current. No other effect is considered.

However, there are other possible interaction mechanisms between the magnetic field and the human body, mainly supported by epidemiological studies, suggesting malignant growth promotion and other negative health effects. Discussion of the scientific aspects of this topic is beyond the scope of this report.

3.4 Safety Code 6

3.4.1 As mentioned previously, there is no Canadian standard and/or guideline or regulation governing exposure to ELF (60Hz power frequency) magnetic fields. The closest exposure standard is Safety Code 6, published by Health Canada. The Safety Code 6 mandate concerns electromagnetic fields from 3,000 Hz upward to a microwave range of 300 GHz.

3.4.2 The Safety Code 6 exposure limit for the general public in the lowest range of frequencies (3 kHz to 1,000 kHz) is 2.19 A/m, which translates to an unperturbed field situation of 2.753 microTesla (27.5mG).

3.5 Industry Practice

3.5.1 Some large corporation's collective agreements stipulate a maximum limit to which workers can be continuously exposed. The exposure limits vary but 10mG is typical.

3.5.2 The Siemon Company manual for communication cabling specifies a distance from sources on EMI interference, which corresponds to approximately 20mG of external power frequency magnetic fields.

3.5.3 Typically, it has been our experience that in situations where EMF exposure has been a concern, facilities have established a threshold of acceptance ranging from 2-10mG. It has been our experience that for a general office environment 5mG has been established as acceptable.

3.5.4 4mG limit is chosen to comply with the City of Toronto guidelines and would primarily apply to childcare facilities, playgrounds, school yards and similar situations.

4.0 CONCLUSIONS & RECOMMENDATIONS

4.1 Summary of Findings

Based on the findings made during our field measurements it can be concluded that at present, the A.C. magnetic field levels are well within acceptable limits.

4.3 Conclusions & Recommendations

Based on the findings in this survey completed on August 2nd, 2022, the A.C. magnetic field on this property is at present within the exposure limits outlined by the City of Toronto guidelines.

Based on the survey findings, we do not anticipate any need for external magnetic field mitigation action at present. However, we recommend a thorough review of the building plans in regard to any possible internal sources of EMF interference; such as main transformers, switchgears and substations, to comply with City of Toronto Exposure guidelines.

We trust this fulfills our assignment, should you have any questions please do not hesitate to contact our office.

Signed by:
C-INTECH

Jan Morava, M.A.Sc., P.Eng.
Encl.: DWG S-169937-01
Photo Documentation (4 pages)
Appendix 1: Excerpt from ICNIRP Guidelines For Limiting Exposure to Time-Varying Electric, Magnetic & Electromagnetic Fields (up to 300 GHz).

C-I C-INTECH

176 BULLOCK DRIVE, UNIT 10
MARKHAM, ON L3P 7N1

NOTES:

STAMP:

TRUE NORTH: N

NOTE:

READING IN mG
RECORDED AT 3FT

PROJECT TITLE:

3400 DUFFERIN STREET
EMF STUDY

DRAWING TITLE:

A.C. MAGNTETIC FIELD
READINGS

DRAWN: F. TSE	CHECKED: E. MORAVA
SCALE: NTS	DATE: 2022-08-03
PROJECT NO. 169937	
DRAWING NO. S-169937-01	REVISION NO. 00

169937 3400 DUFFERIN STREET: PHOTOGRAPHS

PHOTO #1: Elevated A.C. magnetic field readings recorded along Dufferin St near the North York Hydro Vault.

PHOTO #2: A.C. magnetic field readings depleted with distance from North York Hydro Vault.

169937 3400 DUFFERIN STREET: PHOTOGRAPHS

PHOTO #3: A.C. magnetic field readings depleted with distance from North York Hydro Vault.

PHOTO #4: Elevated A.C. magnetic field measurements recorded near transformer located on the North side of the property.

169937 3400 DUFFERIN STREET: PHOTOGRAPHS

PHOTO #5: Telecom lines running along the South side of the property. Not a source of A.C. magnetic field.

PHOTO #6:City of Toronto distribution lines running along Jane Osler Blvd.

169937 3400 DUFFERIN STREET: PHOTOGRAPHS

PHOTO #7: A.C. magnetic field measurements almost non-existent throughout the property.

Table 6. Reference levels for occupational exposure to time-varying electric and magnetic fields (unperturbed rms values).[a]

Frequency range	E-field strength ($V\ m^{-1}$)	H-field strength ($A\ m^{-1}$)	B-field (μT)	Equivalent plane wave power density S_{eq} ($W\ m^{-2}$)
up to 1 Hz	—	1.63×10^5	2×10^5	—
1–8 Hz	20,000	$1.63 \times 10^5/f^2$	$2 \times 10^5/f^2$	—
8–25 Hz	20,000	$2 \times 10^4/f$	$2.5 \times 10^4/f$	—
0.025–0.82 kHz	$500/f$	$20/f$	$25/f$	—
0.82–65 kHz	610	24.4	30.7	—
0.065–1 MHz	610	$1.6/f$	$2.0/f$	—
1–10 MHz	$610/f$	$1.6/f$	$2.0/f$	—
10–400 MHz	61	0.16	0.2	10
400–2,000 MHz	$3f^{1/2}$	$0.008f^{1/2}$	$0.01f^{1/2}$	$f/40$
2–300 GHz	137	0.36	0.45	50

[a] Note:
1. f as indicated in the frequency range column.
2. Provided that basic restrictions are met and adverse indirect effects can be excluded, field strength values can be exceeded.
3. For frequencies between 100 kHz and 10 GHz, S_{eq}, E^2, H^2, and B^2 are to be averaged over any 6-min period.
4. For peak values at frequencies up to 100 kHz see Table 4, note 3.
5. For peak values at frequencies exceeding 100 kHz see Figs. 1 and 2. Between 100 kHz and 10 MHz, peak values for the field strengths are obtained by interpolation from the 1.5-fold peak at 100 kHz to the 32-fold peak at 10 MHz. For frequencies exceeding 10 MHz it is suggested that the peak equivalent plane wave power density, as averaged over the pulse width, does not exceed 1,000 times the S_{eq} restrictions, or that the field strength does not exceed 32 times the field strength exposure levels given in the table.
6. For frequencies exceeding 10 GHz, S_{eq}, E^2, H^2, and B^2 are to be averaged over any $68/f^{1.05}$-min period (f in GHz).
7. No E-field value is provided for frequencies <1 Hz, which are effectively static electric fields. Electric shock from low impedance sources is prevented by established electrical safety procedures for such equipment.

Table 7. Reference levels for general public exposure to time-varying electric and magnetic fields (unperturbed rms values).[a]

Frequency range	E-field strength ($V\ m^{-1}$)	H-field strength ($A\ m^{-1}$)	B-field (μT)	Equivalent plane wave power density S_{eq} ($W\ m^{-2}$)
up to 1 Hz	—	3.2×10^4	4×10^4	—
1–8 Hz	10,000	$3.2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8–25 Hz	10,000	$4{,}000/f$	$5{,}000/f$	—
0.025–0.8 kHz	$250/f$	$4/f$	$5/f$	—
0.8–3 kHz	$250/f$	5	6.25	—
3–150 kHz	87	5	6.25	—
0.15–1 MHz	87	$0.73/f$	$0.92/f$	—
1–10 MHz	$87/f^{1/2}$	$0.73/f$	$0.92/f$	—
10–400 MHz	28	0.073	0.092	2
400–2,000 MHz	$1.375f^{1/2}$	$0.0037f^{1/2}$	$0.0046f^{1/2}$	$f/200$
2–300 GHz	61	0.16	0.20	10

[a] Note:
1. f as indicated in the frequency range column.
2. Provided that basic restrictions are met and adverse indirect effects can be excluded, field strength values can be exceeded.
3. For frequencies between 100 kHz and 10 GHz, S_{eq}, E^2, H^2, and B^2 are to averaged over any 6-min period.
4. For peak values at frequencies up to 100 kHz see Table 4, note 3.
5. For peak values at frequencies exceeding 100 kHz see Figs. 1 and 2. Between 100 kHz and 10 MHz, peak values for the field strengths are obtained by interpolation from the 1.5-fold peak at 100 kHz to the 32-fold peak at 10 MHz. For frequencies exceeding 10 MHz it is suggested that the peak equivalent plane wave power density, as averaged over the pulse width does not exceed 1,000 times the S_{eq} restrictions, or that the field strength does not exceed 32 times the field strength exposure levels given in the table.
6. For frequencies exceeding 10 GHz, S_{eq}, E^2, H^2, and B^2 are to be averaged over any $68/f^{1.05}$-min period (f in GHz).
7. No E-field value is provided for frequencies <1 Hz, which are effectively static electric fields. perception of surface electric charges will not occur at field strengths less than 25 kVm^{-1}. Spark discharges causing stress or annoyance should be avoided.

5 $kV\ m^{-1}$ for 50 Hz or 4.2 $kV\ m^{-1}$ for 60 Hz, to prevent adverse indirect effects for more than 90% of exposed individuals;

- In the low-frequency range up to 100 kHz, the general public reference levels for magnetic fields are set at a factor of 5 below the values set for occupational exposure;
- In the frequency range 100 kHz–10 MHz, the general public reference levels for magnetic fields have been increased compared with the limits given in the 1988 IRPA guideline. In that guideline, the magnetic field strength reference levels were calculated from the electric field strength reference levels by using the far-field

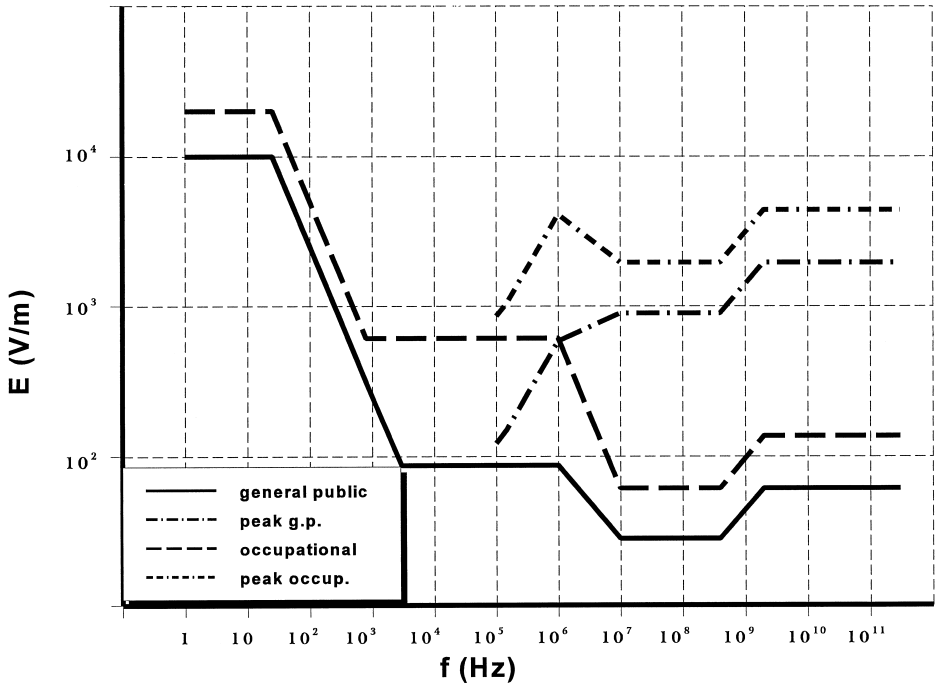

Fig. 1. Reference levels for exposure to time varying electric fields (compare Tables 6 and 7).

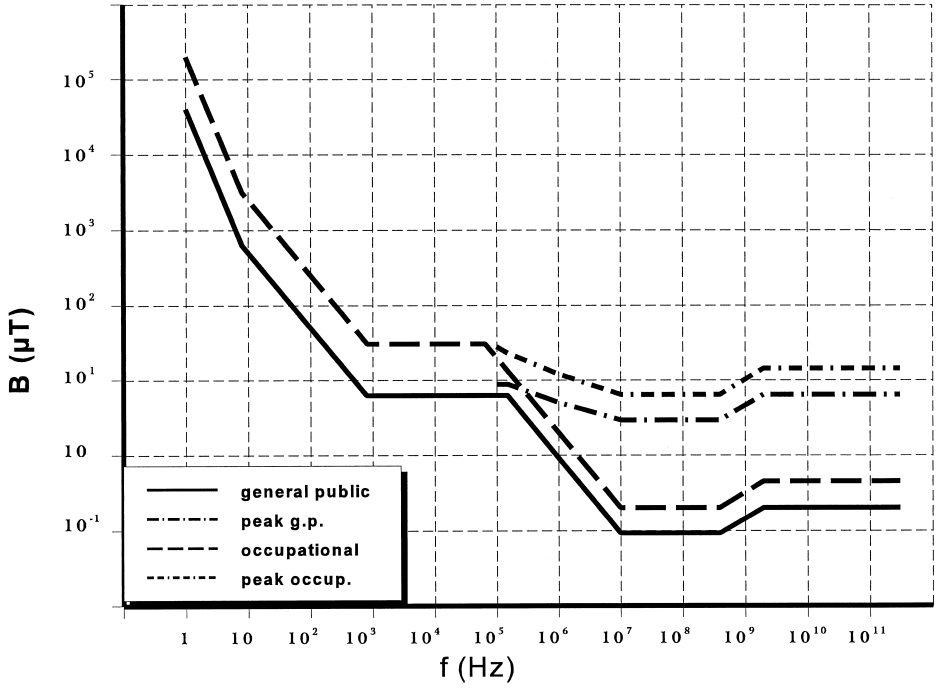

Fig. 2. Reference levels for exposure to time varying magnetic fields (compare Tables 6 and 7).

formula relating E and H. These reference levels are too conservative, since the magnetic field at frequencies below 10 MHz does not contribute significantly to the risk of shocks, burns, or surface charge effects that form a major basis for limiting occupational exposure to electric fields in that frequency range;

- In the high-frequency range 10 MHz–10 GHz, the general public reference levels for electric and magnetic fields are lower by a factor of 2.2 than those set for occupational exposure. The factor of 2.2 corresponds to the square root of 5, which is the safety factor between the basic restrictions for occupational exposure and those for general public