PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 26 05 00 - Common Work Results for Electrical.

1.2 REFERENCES

.1 Canadian Standards Association, (CSA International)
.1 CSA C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
.2 Transformer grounding shall comply with CSA C22.2 No.41-07, Grounding and Bonding Equipment (Bi-National Standard with UL 467).

.2 American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)

1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Grounding equipment to: CSA C22.2 No.41.

2.2 EQUIPMENT

.1 Clamps for grounding of conductor: size as as required.

.2 Copper conductor: minimum 6 m long for each concrete encased electrode, bare, stranded, soft annealed, size as indicated. If not indicated, use 3/0AWG which is the maximum in Table 43 CEC.

.3 System and circuit, equipment, grounding conductors, bare stranded copper, soft annealed, sized as indicated. Insulation where specified to be green.

2.2 EQUIPMENT (Cont'd)

.4 Ground bus: copper, 50mm (2") wide by 6 mm (1/4") deep, length as indicated, complete with insulated supports, fastenings, connectors.

.5 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

.1 Grounding and bonding bushings.
.2 Protective type clamps.
.3 Bolted type conductor connectors.
.4 Thermit welded type conductor connectors.
.5 Bonding jumpers, straps.
.6 Pressure wire connectors.

PART 3 - EXECUTION

3.1 INSTALLATION GENERAL

.1 Install complete permanent, continuous grounding system including, conductors, connectors, accessories.

.2 Provide separate, insulated, copper bonding conductor in EVERY conduit used for power, lighting, fire alarm and every low tension system required in the building. Where wire size is not indicated, provide minimum size per applicable Canadian Electrical Code tables.

.3 Install connectors in accordance with manufacturer's instructions.

.4 Protect exposed grounding conductors from mechanical injury.

.5 Make buried connections, using copper welding by thermit process or permanent mechanical connectors approved for the use.

.6 Use mechanical connectors for grounding connections to equipment provided with lugs.

.7 Soldered joints not permitted.

.8 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit. Provide a ground conductor in all flexible conduit and secure to system grounding lugs at both the equipment and source.

3.1 INSTALLATION GENERAL (Cont'd)

.9 Install separate ground conductor to each outdoor lighting standard.

.10 Connect building structural steel and metal siding to ground by welding copper to steel.

.11 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

.12 Bond single conductor, metallic armoured cables to cabinet at supply end, and provide non-metallic entry plate at load end.

3.2 BUILDING SERVICES GROUNDING

.1 WATER - From the main electrical room ground bus, connect 1#3/0 insulated ground conductor in 27 mm (1") conduit to water main with approved ground clamp ahead of water meter. Install 1#3/0 ground conductor jumper strapped around water meter and associated unions and valves to ground building side of water system.

.2 METALLIC WASTE WATER PIPING - Each metallic waste water piping system to the building to be grounded by bonding it to the interior metallic water supply system by copper bonding jumper of not less than No.6 AWG as per the Canadian Electrical Code.

.3 GAS PIPE GROUNDING - All interior metallic gas piping which may become energized to be made electrically continuous and to be bonded in accordance with requirements of Canadian Electrical Code.

3.3 GROUNDING BUSSES

.1 Provide a ground bus in the main electrical room 002, phone & cable room 003 and LAN room 004.

.2 Ground items of electrical equipment in electrical room to ground bus with individual bare stranded copper connections size 3/0 AWG, or as indicated.

.3 Copper or bronze lugs required for termination of all copper conductors at ground busses.

3.4 EQUIPMENT GROUNDING AND BONDING

.1 Install bonding connections to typical equipment included in, but not necessarily limited to following list. Service equipment, transformers, switchgear, duct systems, frames of motors, starters, UPS, control panels, building steel work, distribution panels and outdoor lighting.

.2 Provide grounding conductor(s) from all major switchgear to solidly ground the secondary system. This includes equipment located in the main electrical room as well as each sub-electrical room. Grounding conductors to be sized to Canadian Electrical Code and switchgear manufacturer's requirements.

3.5 MECHANICAL EQUIPMENT BONDING

.1 Ground wires to be installed in all conduit serving motor feeder circuits and to extend to ground screws on junction and outlet boxes for bonding.

3.6 LOW TENSION SYSTEMS GROUNDING

.1 Install home run a #6 AWG insulated bonding conductor in conduit from the main ground bus to the:
.1 Fire Alarm Panel.
.2 Security Panel.
.3 Communication systems head end.
.4 Security system head end.
.5 Telephone termination in phone & cable room 003.
.6 CATV system.
.7 Data/I.T., telephone, security and electronics equipment racks.

3.7 DATA & VOICE GROUNDING

.1 Install home run insulated ground conductor in conduit from the building main ground bus as follows:
.1 #3/0 AWG to main ground bus in the phone & cable room 003 and LAN room 004.

.2 Unless otherwise solidly bonded, bond all data and telephone incoming and outgoing steel conduits with insulated 1#12 AWG from the nearest "Communication" ground bus.

.3 Provide communications grounding system in accordance detail drawing.

3.8 POST MOUNTED LUMINAIRE GROUNDING

.1 Provide #10 AWG bonding conductor with green RW90 X-link insulation. Connect to luminaire corrosion resistant ground stud or ground clamp.

3.9 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions.

.3 Measure ground grid resistance with earth test megohmmeter and install additional ground rods and conductors as required until resistance to ground complies with Code requirements and is less than 1 ohm. Submit test results to Department Representative.

.4 Carry out all tests required by the Electrical Inspection Authority and provide all required reports and copied to the Departmental Representative.

.5 Ensure test results are satisfactory before energizing the electrical system.

END