ELECTRICAL SPECIFICATIONS

1. GENERAL REQUIREMENTS:

1.1 COMPLY WITH ALL DIVISION 1 GENERAL CONDITIONS. THE ELECTRICAL CONTRACTOR SHALL FOLLOW REQUIREMENTS AS IDENTIFIED BY ARCHITECT AND OTHER CONSULTANTS. COORDINATE WITH ALL TRADES TO ENSURE PROPER INSTALLATION METHODS APPLICABLE TO ALL CONSULTANT SPECIFICATIONS OF THE PROJECT.

1.2 OBTAIN ALL APPROVALS FROM PUBLIC AUTHORITIES HAVING JURISDICTION BEFORE COMMENCING WORK AND PAY ALL INSPECTION FEES AND ALL PERMITS. COMPLY WITH THE REQUIREMENTS OF THE LATEST EDITION OF THE APPLICABLE C.S.A. STANDARDS, BUILDING CODE, LOCAL ELECTRICAL SAFETY CODE APPLICABLE TO AREA HAVING JURISDICTION, APPLICABLE U.L.C. STANDARDS, AND THE OWNER'S REQUIREMENTS. SUBMIT CERTIFICATE OF INSPECTION AND APPROVAL FROM ALL AUTHORITIES HAVING JURISDICTION.

1.3 DO NOT REDUCE THE STANDARDS ESTABLISHED BY THE DRAWINGS AND SPECIFICATIONS BY APPLYING ANY OF THE CODES REFERRED TO HEREIN.

1.4 PROVIDE PROOF OF PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE COVERAGE AND AMOUNT. SUBMIT WITH TENDER.

1.5 THE ELECTRICAL BID, THE ELECTRICAL QUOTATIONS FOR ADDITIONAL WORK AND ALL SUBMISSIONS RELATED TO THE ELECTRICAL SCOPE SHALL BE BY THE ELECTRICAL CONTRACTOR OR SUBCONTRACTOR ENGAGED ON THE PROJECT BASED ON THE ELECTRICAL DRAWINGS SPECIFICATIONS. THE SUBMISSIONS SHALL BE ON THE ELECTRICAL OR SUBCONTRACTOR COMPANY LETTERHEAD, SUPPLEMENTED BY A GENERAL CONTRACTOR LETTERHEAD DOCUMENT WHERE GENERAL CONTRACTOR IS ENGAGED. ALL DOCUMENTS SHALL BE SIGNED AND SEALED WHEN REQUIRED.

1.6 ALL ITEMS STIPULATED AND DESIGNATED AS INSTRUCTIONS TO THE ELECTRICAL CONTRACTOR SCOPE OF WORK SHALL BE APPLICABLE TO ANY SUBCONTRACTOR ENGAGED ON THE PROJECT WHICH SCOPE IS BASED ON THE HAMMERSCHLAG + JOFFE ISSUED DRAWINGS.

2. DRAWINGS:

2.1 EXAMINE ARCHITECTURAL, STRUCTURAL, AND MECHANICAL DRAWINGS BEFORE PROCEEDING WITH THE WORK.

2.2 ANY DISCREPANCIES BETWEEN DRAWINGS AND/OR SPECIFICATIONS MUST BE REFERRED TO THE CONSULTANT BEFORE ANY AFFECTED WORK IS COMMENCED.

2.3 PREPARE INTERFERENCE DRAWINGS IN CONJUNCTION WITH ALL TRADES CONCERNED, SHOWING SLEEVES, CABLES AND CONDUIT, ROUTES, LIGHT FIXTURES AND OPENINGS FOR PASSAGE THROUGH STRUCTURE AND ALL INSERT SIZES AND LOCATIONS

2.4 REFER TO ARCHITECTURAL DRAWINGS FOR EXACT MOUNTING LOCATIONS OF ALL LIGHT FIXTURES AND DEVICES.

2.5 ELECTRICAL DRAWINGS SHALL NOT BE USED FOR EQUIPMENT LAYOUT. DO NOT SCALE ELECTRICAL DRAWINGS; OBTAIN ALL DIMENSIONS FROM ARCHITECTURAL DIVISION.

2.6 NOTE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC IN NATURE; CONTRACTOR IS RESPONSIBLE TO FAMILIARIZE WITH THE PROJECT INTENT BY REVIEWING ALL DRAWINGS RELATED TO THE PROJECT.

2.7 IN CASE OF CONFLICT BETWEEN THE SPECIFICATION AND THE DRAWINGS THE GREATER REQUIREMENT SHALL PREVAIL.

3. COMMON WORK REQUIREMENTS

3.1 ENSURE THAT ALL ELECTRICAL EQUIPMENT SUPPLIED BY OTHER TRADES IS SUITABLE FOR THE RESPECTIVE VOLTAGE. CONFIRM POWER REQUIREMENTS OF ALL OWNER SUPPLIED EQUIPMENT.

3.2 ALL CUTTING AND PATCHING REQUIRED FOR THE WORK OF THIS DIVISION SHALL BE CARRIED OUT BY THIS DIVISION. NO CHASING BLOCK WORK WILL BE ALLOWED.

3.3 ALLOW TO SCAN THE FLOOR PRIOR TO CUTTING IN LOCATION OF EXISTING SERVICES. PROVIDE DUST CONTROL MEASURES DURING CUTTING. DO NOT LEAVE ANY FLOOR TRENCHES OPEN DURING THE DAY. USE TRIP FREE COVERS WITH BEVELED EDGES.

3.4 COMPLY WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR EQUIPMENT AND MATERIAL SUPPLIED. CONTRACTOR SHALL OBTAIN MANUFACTURER'S INSTRUCTIONS, IF NOT PROVIDED WITH EQUIPMENT SUPPLY. TORQUE ALL FASTENERS USING TORQUE WRENCH. ENSURE ALL EQUIPMENT IS LEVELED. MARK FASTENERS ONCE SET, TIGHTEN. EMPLOY USE OF TORQUE MEASURING TOOL.

3.5 BE RESPONSIBLE AND PAY FOR ANY DAMAGE TO THE BUILDING INCURRED BY WORK OF THIS DIVISION.

3.6 SUBMIT THREE (3) - COPIES OF SHOP DRAWINGS FOR REVIEW AND RECORDS, UNLESS ELECTRONIC SUBMISSION IS PROVIDED.

3.7 CLEARLY MARK ALL EXPOSED CONDUIT, PULL BOXES, JUNCTION BOXES, ETC., TO INDICATE THE NATURE OF THE SERVICE.

3.8 PROVIDE LAMACOID NAMEPLATES FOR ALL DISTRIBUTION EQUIPMENT INDICATING SOURCE OF POWER AND EQUIPMENT BEING FED. PROVIDE TYPEWRITTEN DIRECTORIES FOR ALL PANELS.

3.9 CONTRACTOR TO ENSURE THAT THE ELECTRICAL SYSTEMS ARE FUNCTIONAL AND IN GOOD WORKING ORDER AS PER THE ELECTRICAL SPECIFICATIONS AND TO THE INTENT OF THE WORKING ELECTRICAL DRAWINGS.

3.10 ALL EQUIPMENT SUPPLIED BY THIS ELECTRICAL CONTRACTOR SHALL CARRY CSA OR EQUIVALENT CANADIAN CERTIFICATION.

4. FINAL SUBMISSIONS:

4.1 AS-BUILT DRAWINGS:

4.1.1 AFTER COMPLETION OF THE WORK, PROVIDE THE LANDLORD AND TENANT WITH A SET OF REPRODUCIBLE 'AS-BUILT" RECORD DRAWINGS. INCORPORATE ALL CHANGES WITH RECOGNIZED DRAFTING PROCEDURES, AUTOCAD 2007 OR LATER.

4.1.2 AFTER COMPLETION OF WORK, PROVIDE THE FOLLOWING DOCUMENTS:

- CERTIFICATE OF FIRE ALARM VERIFICATION
- HYDRO INSPECTION CERTIFICATE
- EMERGENCY LIGHTING TEST REPORT
- TEST REPORT FOR ALL SPECIFIED TESTING

4.2 OPERATION AND MAINTENANCE MANUALS:

4.2.1 PROVIDE THREE (3) - SETS OF OPERATION AND MAINTENANCE MANUALS SUBMITTED IN HARD COVER BINDERS.

4.2.2 OPERATIONS AND MAINTENANCE MANUALS SHALL INCLUDE, BUT NOT LIMITED TO THE FOLLOWING INFORMATION:

- NAMES AND ADDRESS OF LOCAL SUPPLIERS FOR THE ITEMS INCLUDED
- TECHNICAL DATA, PRODUCT DATA, SUPPLEMENTED BY BULLETINS, COMPONENT ILLUSTRATIONS, MAINTENANCE REQUIREMENTS AND RECOMMENDED SCHEDULES, EXPLODED VIEWS, TECHNICAL DESCRIPTION OF ITEMS, AND PARTS LIST
- THE CONSULTANTS REVIEWED SHOP DRAWINGS
- CERTIFICATE(S) OF ACCEPTANCE FROM THE AUTHORITY'S INSPECTION DEPARTMENT
- VERIFICATION REPORTS AND CERTIFICATE(S) FOR FIRE ALARM COMPONENTS
- LOAD BALANCE REPORT AND WIRING
- MEGGER TESTING REPORT IN GIGA OHM (GΩ) VALUES
- WRITTEN GUARANTEE -COORDINATION STUDY FOR EQUIPMENT INCLUDING RELAY PROTECTION EQUIPMENT, SHORT CIRCUIT AND ARC FLASH EVALUATION IS MANDATORY FOR ALL PROJECTS
- CONTACT INFORMATION
- ELECTRICAL SAFETY INSPECTION REPORT

4.2.3 OPERATION AND MAINTENANCE MANUALS SHALL FORM A COMPLETE DOCUMENTATION FOR THE SUBJECTED ELECTRICAL INSTALLATION AND WILL NOT BE LIMITED TO LINE VOLTAGE POWER EQUIPMENT.

4.2.4 ANY SECURITY, TELEPHONE, OR OTHER MISCELLANEOUS SYSTEMS SHALL ALSO BE INCLUDED IN THE OPERATION AND MAINTENANCE MANUALS.

4.3 PROJECT SUBSTANTIAL COMPLETION AND PROJECT CLOSURE:

4.3.1 AFTER THE WORK IS COMPLETED, GIVE A WRITTEN GUARANTEE FOR ONE (1) YEAR COVERING WORKMANSHIP AND MATERIALS. REPAIR OR REPLACE, WITHOUT EXPENSE TO THE OWNER, ANY DEFECTS DUE TO WORKMANSHIP OR MATERIALS WHICH, IN THE OWNER'S OPINION, ARE NOT DUE TO MISUSE OR NEGLECT. LED LIGHTING SHALL HAVE THREE (3) YEARS INSTALLATION AND MANUFACTURER'S WARRANTY

4.3.2 PROVIDE OWN LIST OF OUTSTANDING AND DEFICIENT WORK PRIOR TO SUBSTANTIAL COMPLETION.

4.3.3 ADJUST AND RECORD LEVELS OF EMERGENCY LIGHTING THROUGHOUT THE FACILITY. AIMING ADJUSTMENT SHALL BE COMPLETED AND ADJUSTED AS NECESSARY AND AS REQUIRED BY AHJ AND CONSULTANT. PROVIDE RECORD OF EMERGENCY LIGHTING TESTING AND EMERGENCY LIGHT LEVEL MEASUREMENTS PRIOR REQUEST FOR SUBSTANTIAL COMPLETION.

4.3.4 PRIOR COMPLETING FIRE ALARM SYSTEM PROGRAMMING OBTAIN APPROVAL FOR SEQUENCE OF OPERATION BY LOCAL AHJ. ALLOW TO COMPETE FIRE ALARM SYSTEM PROGRAMMING ADJUSTMENTS AS REQUESTED BY AHJ AT A LATER DATE.

4.3.5 CLEAN AND TEST ALL EQUIPMENT BEFORE FINAL ACCEPTANCE IS GIVEN FOR THE WORK.

4.3.6 ARRANGE FOR FINAL ELECTRICAL INSPECTION BY ELECTRICAL CONSULTANT FOR ONE WEEK PRIOR TO COMPLETION OF WORK.

5. VALUATION OF CHANGES:

5.1 PROVIDE COMPLETE BREAKDOWN OF MATERIAL, LABOUR, OVERHEAD, PROFIT, ETC., WHEN SUBMITTING QUOTATIONS FOR CHANGE NOTICES ON THIS PROJECT.

5.2 THE HOURLY LABOUR RATE SHALL BE INCLUSIVE OF ALL CHARGES FOR SUPERVISION, VARIABLE LABOUR FACTORS, HAND TOOLS, PAYROLL BURDENS, HEIGHT FACTORS, WARRANTIES, STORAGE, RENTALS, ADDITIONAL BONDING, PARKING, CLEAN-UP, AS-BUILD DRAWINGS, HOISTING, FREIGHT AND DELIVERY, BUT EXCLUSIVE OF OVERHEAD AND PROFIT.

5.3 LABOUR HOURS SHALL BE BASED ON THE LATEST ISSUE OF THE NATIONAL ELECTRICAL CONTRACTOR'S ASSOCIATION (NECA) LABOUR UNITS, COLUMN ONE NORMAL FOR THE DURATION OF THIS CONTRACT. LABOUR FOR SMALL ITEMS SUCH AS, BUT NOT LIMITED TO, COUPLINGS, STRAPS, MARETTES, SCREWS, ETC., WILL NOT BE REIMBURSED.

5.4 THE MATERIAL PRICES SHALL BE BASED ON THE CURRENT NATIONAL PRICE SYSTEM (NPS) CATALOGUE LESS APPLICABLE TRADE DISCOUNTS.

6. PROGRESS BILLING:

6.1 PROVIDE COMPLETE BREAKDOWN OF MATERIAL, LABOUR, AND GENERAL COSTS WHEN SUBMITTING PROGRESS DRAW REQUEST.

6.2 SEPARATE BILLING SECTION FOR EACH SYSTEM INSTALLED AS PART OF THE PROJECT, SEPARATE SECTION SHALL MINIMUM INCLUDE HOWEVER NOT BE LIMITED TO THE FOLLOWING: LIGHTING, POWER DISTRIBUTION, FIRE ALARM, RACEWAYS, WIRING, GENERAL COSTS, FINAL SUBMISSION (AS-BUILT, MANUALS, WARRANTY, CERTIFICATES).

6.3 FINAL SUBMISSION COSTS SHALL BE FINE-TUNED PER VALUE OF PROJECT; SHALL INCLUDE A MINIMUM COST FOR THE BELOW PROJECT VALUES :

- PROJECT VALUE = < $100,000, CLOSE OUT COST = $5,000
- PROJECT VALUE = < $500,000, CLOSE OUT COST = $7,500
- PROJECT VALUE = < $1,000,000, CLOSE OUT COST = $10,000
- PROJECT VALUE > $1,000,000, CLOSE OUT COST = 1 %

7. BASIC METALS AND MATERIALS:

7.1 ALL MATERIALS USED SHALL BE SUITABLE FOR THEIR APPLICATION. ALL EXTERIOR FASTENERS AND SUPPORTING MATERIALS FORMING A COMPLETE ELECTRICAL SYSTEM SHALL BE WEATHERPROOF. NUTS, BOLTS, SCREWS ETC. MATERIAL SHALL BE STAINLESS STEEL OR APPROVED EQUIVALENT.

7.2 ALL MATERIALS USED THROUGHOUT SHALL BE NEW, HIGHEST QUALITY C.S.A. APPROVED AND OF ONE MANUFACTURER. WHEREVER TRADE NAMES ARE NOT USED TO DESCRIBE MATERIALS, THESE MATERIALS SHALL BE OF BEST AVAILABLE QUALITY AND MANUFACTURER. OBTAIN AND PAY FOR SPECIAL HYDRO INSPECTION OF SPECIFIED NON-C.S.A. ELECTRICAL EQUIPMENT.

7.3 MATERIALS AND EQUIPMENT PROVIDED SHALL BE LISTED FOR HEAVY DUTY APPLICATION AND SHALL BE SUITABLE FOR THE INTENDED USE, COMMERCIAL, INDUSTRIAL OR RESIDENTIAL.

7.4 PROVIDE ALL CONDUIT, WIRING, BOXES, SWITCHES, OUTLETS, DEVICES, ETC., AS REQUIRED. MAKE FINAL CONNECTIONS TO VIBRATING EQUIPMENT WITH FLEXIBLE CONDUIT.

7.5 ELECTRICAL BOXES FOR SUPPORT OF EXTERIOR OR WALL LIGHT FIXTURES SHALL BE RIGID TYPE, C/W POINT SUPPORT, RATED FOR A MINIMUM OF 22.5KG WEIGHT.

7.6 ALL LIGHT FIXTURES SHALL BE INDEPENDENTLY SUPPORTED FROM FINISHED DRY WALL OR T-BAR CEILING. INCLUDE FOR ALL HANGERS AND NECESSARY MISCELLANEOUS SUPPORTS FROM JOIST, BEAM, OR DECK.

7.7 ANY LUMINAIRE INSTALLED IN SUSPENDED CEILING SHALL BE WIRED BY A FLEXIBLE CORD NOT EXCEEDING 3M IN LENGTH.

7.8 PROVIDE ALL HANGERS, INSERTS, AND SUPPORTS OF APPROVED TYPES REQUIRED FOR THE WORK OF THIS DIVISION. PROVIDE CONDUIT FOR ALL SERVICES PENETRATING THE FLOOR SLAB. SEAL ALL PENETRATIONS THROUGH FLOOR SLABS AND FIRE AND SMOKE SEPARATIONS WITH AN APPROVED NON-SHRINK, WATERPROOF AND FIREPROOF SEALANT APPROVED BY CONSULTANT:

- HILTI, 3M OR APPROVED ALTERNATE.

8. CONDUITS:

8.1 ALL CONDUIT SHALL BE C.S.A. APPROVED, RIGID STEEL THICK WALLED OR EMT THINWALL WITH STEEL SET SCREW COUPLINGS AND CONNECTORS WITH INSULATED THROATS UNLESS OTHERWISE NOTED. CONDUITS AND ELECTRICAL BOXES IN FINISHED AREAS ACCESSIBLE BY PUBLIC SHALL BE CONCEALED UNLESS OTHERWISE NOTED. EXPOSED CONDUITS AND ELECTRICAL BOXES ARE ALLOWED ONLY IN UTILITY ROOMS AND BACK OF HOUSE CORRIDORS. EXPOSED CONDUITS AND OTHER RACEWAYS WHERE APPROVED SHALL BE NEAT IN APPEARANCE, RUN PARALLEL TO BUILDING LINES AND CONCENTRIC RIGHT-ANGLE BENDS ONLY SHALL BE USED. CONDUIT WORK FOR ALL EXTERIOR DEVICES SHALL BE INSTALLED CONCEALED AND ON THE INTERIOR SIDE OF THE BUILDING ENVELOPE.

8.2 RIGID PVC CONDUIT TO CSA C22.2 NO. 211.1, RIGID TYPES EB1 AND DB2/ES2 PVC CONDUIT, FT-4 RATED, COMPLETE WITH SITE MADE HEAT GUN BENDS FOR CONDUIT TO AND INCLUDING 50 MM (2") DIAMETER, FACTORY MADE FITTINGS FOR CONDUIT LARGER THAN 50 MM (2") DIAMETER, SOLVENT WELD JOINTS, FACTORY MADE EXPANSION JOINTS WHERE REQUIRED, AND TERMINATIONS MADE WITH PROPER AND SUITABLE CONNECTORS AND ADAPTORS. PVC CONDUITS SHALL BE USED UNDERGROUND AND WHERE APPROVED BY CONSULTANT UPON CONTRACTOR REQUEST

8.3 CONNECTORS TO ELECTRICAL PANELS, FIRE ALARM PANEL, SWITCHBOARDS, ETC., HEAD-MAIN EQUIPMENT SHALL BE C/W RAIN TIGHT CONNECTORS TO ENSURE EQUIPMENT INTEGRITY IN CASE OF WATER SPILLAGE.

8.4 CONDUITS SHALL BE INSTALLED OVERHEAD AND SHALL NOT BE SUSPENDED FROM THE ROOF DECK. INSTALL ALL CONDUITS AT JOIST LEVEL FROM TOP PART OF THE JOIST OR FROM THE BEAM. PROVIDE ALL REQUIRED CONDUIT SUPPORT HARDWARE.

8.5 LARGEST CONDUITS APPROVED TO BE USE FOR CONNECTION OF BRANCH CIRCUITS IS 1-1/4". ANY DEVIATION WILL TRIGGER REWORK OF INSTALLED CONDUITS.

8.6 EMPTY CONDUITS SHALL BE COMPLETE WITH NYLON PULL WIRE.

9. WIRING

9.1 ALL WIRING SHALL BE MINIMUM #12 GAUGE COPPER, EXCEPT AS OTHERWISE NOTED. ALL WIRING SHALL BE 600 VOLT TYPE RW90 FOR PANEL FEEDERS INSTALLED IN METALLIC CONDUIT, UNLESS OTHERWISE NOTED. CIRCUIT BRANCH WIRING SHALL BE T-90 CU JACKETED CONDUCTOR. AC-90 CABLES MAY BE USED WHERE PERMITTED BY CODE IN CEILING SPACE FOR FINAL CONNECTION TO LIGHT FIXTURE AND FROM CEILING DISTRIBUTION BOXES DOWN HOLLOW PARTITIONS TO RECEPTACLES ONLY.

9.2 MINIMUM SIZE WIRING FOR DC WIRING SHALL BE #10 GAUGE. MAXIMUM VOLTAGE DROP SHALL NOT EXCEED 2% AT ALL FINAL OUTLET LOCATIONS.

9.3 BRANCH CIRCUIT WIRING VOLTAGE DROP SHALL BE 2% FOR ALL FEEDER CONDUCTORS AND TOTAL 4% TO FINAL OUTLET. MINIMUM WIRE SIZE DEPICTED ON ELECTRICAL DRAWINGS CONTRACTOR TO INCREASE TO ACCOMMODATE FOR ANY VOLTAGE DROP DUE TO LENGTHS OF WIRE.

9.4 ALL WIRING SHALL BE SIZED COMPLIANT WITH 75°C RATED EQUIPMENT, SUBJECT TO DERATING AS PER TABLES 5A, 5B, 5C & 5D.

9.5 UNDERGROUND WIRING FEEDERS AND BRANCH WIRES SHALL BE RWU RATED FOR DIRECT BURIAL INSTALLED IN SPECIFIED UNDERGROUND CONDUITS AS NOTED ON THE ELECTRICAL DRAWINGS.

9.6 CHANGE OF LOCATION OF WIRING DEVICES WITH IN 5M OF THE NOTED LOCATION ON THE DRAWINGS SHALL BE AT NO COST TO THE CLIENT PROVIDED THAT THE LOCATION IS CLARIFIED PRIOR TO INSTALLATION.

9.7 CALL FOR ROUGH-IN INSPECTION BY AUTHORITIES HAVING JURISDICTION PRIOR TO CLOSING WALLS AND CEILNGS. PAY ALL FEES AND PROVIDE RECORDS OF INSPECTION COMPLETION.

9.8 UNDERGROUND WIRING FEEDERS AND BRANCH WIRES SHALL BE RWU RATED FOR DIRECT BURIAL INSTALLED IN SPECIFIED UNDERGROUND CONDUITS AS NOTED ON THE ELECTRICAL DRAWINGS.

10. WIRE TESTING:

10.1 ALL FEEDERS SHALL BE MEGGER TESTED WITH 1000VDC (FOR CABLES RATED 300V OR LESS MEGGER TEST IS 500VDC) APPROVED MEGGER TEST.

10.2 HAND CRANKED INSTRUMENTS ARE NOT ALLOWED. SUBMIT MEGGER TEST RESULT READINGS IN G Ω (GIGA – OHM) PRIOR TO POWER ON.

11. GROUNDING AND BONDING:

11.1 PROVIDE GROUND/BOND WIRES WITH ALL FEEDERS INCLUDING TENANT SERVICES. GROUND/BOND WIRE IN CONDUITS SHALL BE INSULATED - GREEN STRANDED #6 AWG. MINIMUM.

11.2 PROVIDE BONDING GREEN INSULATED WIRE IN EACH CONDUIT. SIZE TO ONTARIO ELECTRICAL CODE REQUIREMENTS.

11.3 PROVIDE MAIN GROUND SYSTEM TO HYDRO UTILITY SUPPLY COMPANY APPROVAL.

11.4 MAIN ELECTRICAL ROOM GROUNDING SHALL CONSIST OF MINIMUM OF TWO (2) 3/4," DIAMETER, 10' LONG CU GROUNDING RODS INTERCONNECTED WITH 2/0 BARE COPPER CONDUCTOR. INTERCONNECT MAIN ELECTRICAL ROOM GROUNDING TO THE POWER TRANSFORMER, WHERE APPLICABLE, WITH BARE COPPER CONDUCTOR. GROUND INTERCONNECTION SHALL BE COMPLETED, VISIBLE AND ACCESSIBLE FOR INSPECTION IN APPROVED 10"X10" PVC JUNCTION BOX EMBEDDED IN FINISHED FLOOR. CONTRACTOR TO SUPPLY AND INSTALL CU GROUND BUS ON THE WALL IN MAIN ELECTRICAL AND PROVIDE THE FOLLOWING GROUNDING CONNECTIONS:

- 2/0 CU BARE TO MAIN BOARD OR SWITCH GROUNDING LUGS
- 2/0 CU BARE TO REBAR
- 2/0 CU BARE TO BUILDING STEEL
- 2/0 CU BARE TO WATER MAIN IF MADE OF METAL
- #6 CU TO MAIN GAS PIPE WITH GROUNDING BRIDGE ACROSS THE GAS METER
- #6 CU TO EACH TENANT SPACE GAS LINE AS IT ENTERS THE TENANT SPACE. IF APPLICABLE-EXTEND TENANT SERVICE GROUND WIRE.
- #6 CU INSULATED TO 12 POSITION GROUND BUS (2"X6" - CU) FOR TELEPHONE SERVICE. 12 POSITION GROUND BUS ON INSULATORS TO BE PROVIDED AND INSTALLED BY THIS CONTRACTOR.

11.5 USE CADWELD LUGS FOR FINAL CONNECTION AND TERMINATION OF GROUND/BOND WIRING.

11.6 CO-ORDINATE WITH OTHER TRADES IN LAYING OUT OF THE WORK SO AS NOT TO CONFLICT WITH THE WORK OF OTHER TRADES. CARRY OUT WORK PROMPTLY.

11.7 FOR HIGH VOLTAGE SYSTEM REFER TO HIGH VOLTAGE SPECIFICATION AND UTILITY STANDARDS.

12. MECHANICAL TRADES WIRING:

12.1 PROVIDE ALL CONDUIT, WIRING, SPLITTERS, OUTLET BOXES AND DISCONNECT SWITCHES AS SHOWN. FOR ALL MOTORS STARTERS, AND CONTROL WIRING PER BELOW. 120V CONTROL EQUIPMENT PROVIDED UNDER DIVISION 15. DIVISION 16 SHALL INSTALL ALL LINE VOLTAGE STARTERS, THERMOSTATS, AND WIRING. PROVIDE ALL LINE VOLTAGE WIRING AS REQUIRED.

13. IT, LV AND COMMUNICATIONS SYSTEMS:

13.1 SUPPLY AND INSTALL THE REQUIRED DUCT BANKS, EMPTY RACEWAY SYSTEM C/W HD PULL WIRES, PULL BOXES, TERMINATION PANELS, OUTLET BOXES, COVER PLATES, SUITABLE FOR THE INSTALLATION OF IT AND COMMUNICATIONS CABLES AND ASSOCIATED EQUIPMENT, BY THE IT COMPANY AND UTILITY. THE COMPLETE CONDUIT INSTALLATION SHALL MEET ALL THEIR REQUIREMENTS.

13.2 RACEWAYS SHALL BE RIGID, GALVANIZED STEEL CONDUIT WHERE EXPOSED TO MECHANICAL INJURY. IN ALL OTHER LOCATIONS, EMT MAY BE USED. MINIMUM CONDUIT SIZE TO BE 19MM. WORK TO BE DONE TO C.S.A T527 AND C.S.A T530 LATEST STANDARDS.

13.3 ALL DATA OUTLETS SHALL BE WIRED WITH EMPTY PULL STRINGS.

13.4 PVC DUCT SHALL BE USED FOR UNDERGROUND SERVICE ENTRANCE.

13.5 PROVIDE TWO DEDICATED 110V 15AMP 1POLE POWER OUTLET ADJACENT TO THE IT EQUIPMENT LOCATIONS FOR UTILITY COMPANY REQUIREMENTS.

13.6 UNLESS OTHERWISE SHOWN, STEEL PULL BOXES SHALL BE INSTALLED EVERY 30M OR LESS OF STRAIGHT CONDUIT RUN; EVERY 25M OR LESS OF STRAIGHT CONDUIT RUN AND ONE 90 DEGREE BEND OR EQUIVALENT; EVERY TWO 90 DEGREE BENDS OR EQUIVALENT.

13.7 A #6 GROUND WIRE SHALL BE RUN FROM THE TELEPHONE SERVICE PANEL TO SERVICE GROUND TO PROVIDE A GROUND FOR THE TELEPHONE SYSTEM.

14. DISTRIBUTION FEEDERS:

14.1 FEEDERS SHALL BE SIZED AS DETAILED. SUBSTITUTION OF FEEDERS EITHER IN MATERIAL OR ROUTING WILL NOT BE PERMITTED UNLESS ENGINEER'S WRITTEN APPROVAL IS OBTAINED. FEEDERS SHALL HAVE A MAXIMUM VOLTAGE DROP OF 2% AT FULL LOAD AT THE PANELS SUPPLIED. ALL FEEDERS SHALL BE BALANCED UNDER FULL LOAD CONDITIONS TO WITHIN 5% BETWEEN PHASES. ALL PHASES AND NEUTRALS SHALL BE IDENTIFIED AND MAINTAINED IN THEIR CORRECT ORDER WHEN READING LEFT TO RIGHT THROUGHOUT THE BUILDING.

14.2 FEEDERS TO PANELS, TRANSFORMER, INCOMING SERVICE AND LOAD CENTERS SHALL BE BALANCED UNDER FULL LOAD CONDITIONS TO WITHIN 5% BETWEEN PHASES. ALL PHASES AND NEUTRALS SHALL BE IDENTIFIED AND MAINTAINED IN THEIR CORRECT ORDER WHEN READING LEFT TO RIGHT THROUGHOUT THE BUILDING.

14.3 ALL PHASES AND NEUTRALS SHALL BE IDENTIFIED AND MAINTAINED IN THEIR CORRECT ORDER WHEN READING LEFT TO RIGHT THROUGHOUT THE BUILDING.

14.4 MEGGER ALL FEEDERS TO MEET CODE AND LATEST NETA MANUAL. ALL FEEDERS SHALL BE MEGGER TESTED WITH 1000VDC APPROVED MEGGER TESTER, HAND CRANKED INSTRUMENTS ARE NOT PERMITTED. SUBMIT TEST RESULTS FOR CONSULTANT REVIEW PRIOR TO POWER ON.

14.5 REPLACE AT NO COST ALL FEEDERS THAT DO NOT MEET MINIMUM INSULATION RESISTANCE.

14.6 ALL DISTRIBUTION FEEDERS SHALL BE 90°C RATED.

15. ELECTRICAL EQUIPMENT ENCLOSURE RATING:

15.1 EQUIPMENT SHALL BE NEMA 2 RATED WHEN INDOOR AND NEMA 4 WHEN OUTDOOR. OUTDOOR DEVICES SHALL BE SUITABLY RATED FOR THEIR ENVIRONMENT.

16. ELECTRICAL PANEL BOARDS:

16.1 EACH PANEL BOARD SHALL BE C/W A KEY LOCKABLE HINGED DOOR AND A CIRCUIT DIRECTORY GIVING THE NUMBER AND DESCRIPTION OF EACH CIRCUIT CONTROLLED. THE DIRECTORIES SHALL BE CLEARLY TYPED, LEGIBLE AND OF AMPLE SIZE AND SHALL BE MOUNTED IN A METAL FRAME WITH A CLEAR PLASTIC COVER ON THE INSIDE OF THE DOOR.

16.2 THE CIRCUIT BREAKERS SHALL BE CONNECTED TO THE PANEL BY BOLTED CONNECTIONS. ALL BUS BARS, LUGS, AND BREAKER TERMINALS SHALL BE ALUMINUM SILVER-PLATED AT THE CONNECTION POINTS. THE INTERRUPTING CAPACITY OF EACH BOARD SHALL BE DETERMINED BY THE CO-ORDINATION STUDY AS PER DRAWINGS. MINIMUM 10KA FOR 208V PANELS AND 18KA FOR 347/600V PANELS, WHEN REMOTELY LOCATED FROM THE MAIN ELECTRICAL SERVICE. ELECTRICAL PANELS INSIDE MAIN ELECTRICAL ROOM SHALL BE RATED NOT LESS THAN: 25KAIC FOR 347/600V PANELS AND MINIMUM 10KA FOR 208V PANELS. REFER TO COORDINATION STUDY FOR DETAILS OF REQUIRED RATING. NOT WITHSTANDING THE ABOVE ALL SUPPLIED ELECTRICAL EQUIPMENT SHALL BE APPLICABLE FOR SERIES RATING LISTED WITH CLASS J FUSE.

16.3 NOTWITHSTANDING THE ABOVE, PANEL BOARDS CONNECTED TO THE SECONDARY SIDE OF TRANSFORMERS, 600-120/208 VOLT AND 600-120/240 VOLT, SIZED 225KVA AND HIGHER SHALL BE RATED MINIMUM 22KAIC.

16.4 ALL TWO OR THREE POLE BREAKERS SHALL OPERATE WITH A COMMON TRIP AND WITH A SINGLE HANDLE. TWO POLE CIRCUIT BREAKERS CONSISTING OF TWO SINGLE POLE BREAKERS WITH A TIE HANDLE, TWIN BREAKERS.

16.5 SELECTED PANEL BOARD AND BREAKER TYPE COMBINATION SHALL ALLOW FOR INSTALLATION OF THREE POLE BREAKERS WITH AMPERAGE RATING NO LESS THAN 50% OF THE PANEL AMPERAGE RATING WITHOUT USE OF SPECIAL PURPOSE BREAKER KIT AND NOT REQUIRING MORE THAN THREE SINGLE POLE BREAKER SPACES.

16.6 ALL PANEL BOARDS SHALL BE SPRINKLER PROOF AS REQUIRED TO MEET LOCAL AND HYDRO CODES.

16.7 ALL ELECTRICAL EQUIPMENT SHALL BE 75°C RATED OR HIGHER.

16.8 ALL PANEL BOARDS SHALL BE FULLY BUSSED AND COMPLETE WITH BREAKER MOUNTING HARDWARE FOR ALL BREAKER SPACES.

17. COVER PLATES:

17.1 COVER PLATES FOR RECEPTACLES, SWITCHES, PILOT LIGHTS, TELEPHONE OUTLETS AND OTHER DEVICES REQUIRING COVER PLATES FOR FLUSH MOUNTED BOXES SHALL BE:

17.1.1 WHITE WHEN OUTLETS INSTALLED ON WHITE WALLS,

17.1.2 COLOURED MATCHING THE WALL COLOUR BASED ON AVAILABLE STANDARD COVER PLATES

17.1.3 METAL, STAINLESS STEEL, #18-8, TYPE 302 WHEN OUTLETS INSTALLED IN BACK OF HOUSE CORRIDORS, UTILITY, ELECTRICAL ROOMS, AND OTHER AREAS NOT ACCESSIBLE TO THE PUBLIC.

17.1.4 NOTWITHSTANDING THE ABOVE, COVER PLATES IN PUBLIC AREAS SHALL BE BASED ON INTERIOR DESIGN OR ARCHITECTURAL DRAWINGS.

17.2 WEATHERPROOF COVER PLATES SHALL BE DIECAST CORROSION RESISTANT ALUMINUM TYPE WITH TWO SEPARATE LIDS FOR DUPLEX RECEPTACLES SUITABLE FOR MOUNTING ON F.S. TYPE BOXES. ALL WEATHERPROOF COVER PLATES SHALL HAVE RUBBER OR NEOPRENE GASKETS.

17.3 EXTERIOR COVER PLATES SHALL BE METAL IN-USE COVERS, INTERMATIC WP101OMXD, WP1250MVXD, WP3110MXD, OR APPROVED EQUIVALENT.

17.4 PLATES FOR SURFACE MOUNTED CAST BOXES SHALL BE GALVANIZED FORMED STEEL TYPE.

17.5 COVER PLATES FOR FLUSH MOUNTED EQUIPMENT SHALL BE SUPPLIED OF QUALITY AND PERFORMANCE SPECIFIED BY THE MANUFACTURER OF THE EQUIPMENT.

17.6 COVER PLATES SHALL NOT CARRY MANUFACTURER'S NAME.

17.7 COVER PLATES OF QUALITY SPECIFIED SHALL BE PASS AND SEYMOUR, BRYANT, LEVITON, OR HUBBELL.

18. SWITCHES:

LIGHTING

18.1 SWITCHES SHALL BE, UNLESS OTHERWISE NOTED, BRYANT QUIET TYPE WITH WHITE SPECIFICATION GRADE FOR 120V AND HEAVY-DUTY GRADE FOR 347V.

18.2 LIGHT SWITCHES OF QUALITY AS MANUFACTURED BY BRYANT, P & S, LEVITON AND HUBBELL, SHALL BE CONSIDERED AS ACCEPTABLE AS SPECIFIED ALTERNATES.

18.3 DIMMERS SHALL BE LUTRON SPECIFICATION GRADE OR APPROVED ALTERNATE. OCCUPANCY SENSORS SHALL BE WATTSTOPPER DUAL TECHNOLOGY OR APPROVED EQUIVALENT.

DISCONNECT SWITCHES

18.4 DISCONNECT SWITCHES FOR MECHANICAL AND ALL OTHER EQUIPMENT SHALL BE HEAVY DUTY DOUBLE THROW SAFETY SWITCHES, LOAD BREAK, WITH KA RATING EQUIVALENT TO THE UPSTREAM FUSE. IN CASE OF CIRCUIT BREAKER PROTECTION, AND NOT WITHSTANDING LINE DIAGRAMS FUSIBLE DISCONNECT SWITCHES SHALL BE PROVIDED IF NO CURRENT LIMITING DEVICE IS PROVIDED UPSTREAM IN THE ELECTRICAL SYSTEM.

18.5 ELEVATOR DISCONNECT SWITCHES SHALL BE AS PER ABOVE SECTION AND COMPLETE WITH AUXILIARY CONTACTS IDENTIFYING OPEN/CLOSE SWITCH STATUS AND WIRED TO THE ELEVATOR CONTROLLER.

18.6 FUSIBLE DISCONNECTS SWITCHES SHALL MATCH SPECIFICATION AS ITEM 18.4 HOWEVER FUSIBLE WITH CLASS J OR CLASS R FUSES AS REQUIRED.

19. RECEPTACLES:

19.1 RECEPTACLES SHALL BE, UNLESS OTHERWISE NOTED, U-GROUND TYPE, WHITE SCREW TERMINAL TYPE.

19.2 RECEPTACLES SHALL BE SPECIFICATION GRADE, MADE BY: HUBBELL, LEVITON, T&B OR EQUIVALENT, 15 AMP, 120 VOLT UNLESS OTHERWISE NOTED.

19.3 ROOF/PARAPET RECEPTACLES SHALL BE VERTICALLY MOUNTED, CONDUIT WORK SHALL BE CONCEALED WITH IN THE STRUCTURE CAVITY. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR SEALING AND WATER PROOFING OWN PENETRATIONS.

19.4 HVAC RECEPTACLES SHALL BE 20 AMP AND COMPLETE WITH WHILE IN USE COVER, DIE-CAST ALUMINUM, MADE BY INTERMATIC.

20. DISTRIBUTION COORDINATION STUDY, SHORT CIRCUIT & COMMISSIONING REPORT:

20.1 PROVIDE A DISTRIBUTION COORDINATION, SHORT CIRCUIT AND ARC FLASH STUDY TO CONFIRM THAT ALL EQUIPMENT OFFERED IS SUITABLY RATED. THE REPORT TO BE SIGNED BY PROFESSIONAL ENGINEER. PROVIDE THE COORDINATION SHORT CIRCUIT STUDY WITH THE DISTRIBUTION SHOP DRAWINGS. SUBMISSION OF ALL EQUIPMENT, SHOW ALL SWITCHGEAR AND DISTRIBUTION FROM THE SERVICE ENTRY TO THE LAST PANEL. OBTAIN DETAILS FROM UTILITY AND INCORPORATE INTO STUDY. DETAILS FOR THE STUDY SHALL BE PROJECT SPECIFIC, DEFAULT ANSI AND NEMA EQUIPMENT DETAILS SHALL NOT BE ACCEPTED. COORDINATION SHALL INCLUDE BUT NOT BE LIMITED TO: LINE DIAGRAMS C/W FAULT LEVELS, LINE DIAGRAMS C/W WIRE LENGTHS AND WIRE SPECIFICATIONS, LINE DIAGRAMS C/W ARC FLASH LEVELS, SELECTIVE COORDINATION PLOTS AND TABLE WITH BREAKER SETTING

20.2 CONTRACTOR SHALL OBTAIN ALL DATA AS REQUIRED BY THE POWER SYSTEM STUDIES IN WRITING. THE CONTRACTOR SHALL EXPEDITE COLLECTION OF THE DATA TO ELIMINATE UNNECESSARY DELAYS AND TO ASSURE COMPLETION OF THE STUDIES REQUIRED FOR FINAL APPROVAL OF THE DISTRIBUTION SHOP DRAWINGS AND/OR PRIOR TO THE RELEASE OF THE EQUIPMENT FOR MANUFACTURING.

20.3 PROVIDE ALL REQUIRED ARC FLASH LABELS AS PER Z462. LABELS SHALL COMPLY WITH CSA Z462 Q4 STANDARD LABEL.

20.4 ALLOW TO FULLY COMMISSION THE SWITCHGEAR AT THE END OF THE PROJECT. WORK TO BE DONE BY AN INDEPENDENT SPECIALIST. CARRY OUT AN INFRARED SCAN OF THE ENTIRE DISTRIBUTION UNDER LOAD CONDITIONS. RETORQUE ALL EQUIPMENT CONNECTIONS, INCLUDING BUT NOT LIMITED TO BUSSING, BREAKERS, WIRE TERMINATIONS. COMPLETE ONSITE BREAKER TESTING TO CONFIRM BREAKER RELAY OPERATION. PROVIDE WRITTEN RECORDS OF TESTING INCLUDING VISUAL INSPECTION OF RELAY CONTROL WIRING AND LOCATION OF ALL CT SENSORS.

20.5 PROVIDE AN ARC FLASH STUDY AND PROVIDE ARC FLASH RATING LABELS ON ALL ELECTRICAL DISTRIBUTION EQUIPMENT AND PANELS.

21. AUTOMATIC CONTROL OF EXTERIOR LIGHTS:

21.1 CONTACTORS, PHOTO-ELECTRIC CONTROLS AND TIME SWITCHES SHALL BE USED TO CONTROL THE EXTERIOR LIGHTING INCLUDING POLE LIGHTING.

21.2 THE PHOTO-ELECTRIC CELL AND TIME CLOCKS SHALL BE WIRED SO AS TO CONTROL A MAGNETIC CONTACTOR. EACH CONTACTOR SHALL HAVE AN ON-OFF-AUTO' SWITCH TO PERMIT MANUAL OPERATION OF THE INDIVIDUAL CONTACTOR. CONTACTORS TO BE MINIMUM 20A HID LIGHTING DUTY. TIME CLOCKS TO BE DIGITAL COMPLETE WITH ASTRONOMIC CLOCK AND DAY LIGHT SAVINGS PROGRAMMABLE FEATURES.

21.3 CONTACTORS SHALL HAVE LAMACOID NAMEPLATES INDICATING THAT CONTROL CIRCUIT IS SUPPLIED FROM A DIFFERENT SOURCE.

22. SERVICE ENTRANCE SWITCHBOARD:

22.1 THE SERVICE ENTRANCE BOARD SHALL CONSIST OF A COMPLETE METAL ENCLOSED FREE-STANDING STRUCTURE CONSISTING OF A MAIN OVER CURRENT DEVICE COMPARTMENT, HYDRO METERING AS REQUIRED, METERING PANEL DISTRIBUTION SECTIONS AND THE THROUGH FLOOR/WALL BUS DUCT TO THE VAULT C/W FIRE BARRIER. DETAILS OF MAIN INCOMING SERVICE, VERIFY WITH LOCAL DISTRIBUTION COMPANY PRIOR TO SUBMISSION OF SHOP DRAWINGS.

22.2 BUS WORK SHALL BE ALUMINUM SILVER-PLATED, BRACED TO WITHSTAND MAXIMUM AVAILABLE SHORT CIRCUIT IN THE SYSTEM. BREAKERS AND FUSES SHALL HAVE ADEQUATE INTERRUPTING AND DUTY CAPACITY AND SHALL BE FULLY COORDINATED WITH THE CONNECTED EQUIPMENT ON THE LOAD AND LINE SIDE. INTERRUPTING AND DUTY CAPACITY NO LESS THAN 50KAIC.

22.3 FUSES PROVIDED SHALL BE CLASS J OR L MADE BY BUSSMANN OR EQUIVALENT CANADIAN MANUFACTURER.

22.4 MOTOR CIRCUITS SHALL HAVE RK CLASS FUSE – TIME DELAY STYLE.

22.5 BALANCE OF FUSE SHALL BE SELECTED BASED ON COORDINATION STUDY AND SHALL BE DUAL ACTION CURRENT LIMITING STYLE.

22.6 THE MAIN OVER CURRENT DEVICE COMPARTMENT SHALL CONTAIN BREAKER OF TYPE FRAME AND SIZE OR FUSED DISCONNECT SWITCH WITH FUSES OF TYPE AND SIZE AS INDICATED.

22.7 MAIN SWITCH OR BREAKERS SHALL BE EQUIPPED WITH GROUND FAULT RELAYS AS REQUIRED BY CODE. IN ADDITION, ALL UNDERGROUND FEEDERS 400 AMP AND LARGER SHALL BE GROUND FAULT PROTECTED. PROVIDE GROUND FAULT EQUIPMENT WHERE INDICATED ON DRAWINGS AND AS REQUIRED BY CODE.

22.8 WHERE SPECIFIED ON THE DRAWINGS L-S-I-G BREAKERS: THESE SHALL BE FULLY ADJUSTABLE ACROSS ALL REGIONS, ADJUSTABLE TIME AND PICK UP SETTINGS FOR ALL L-S-I-G DOMAINS. INSTANTANEOUS AND GROUND FAULT SETTINGS SHALL BE FULLY COORDINATED WITH UPSTREAM DEVICES HAVING HIGHER WITHSTAND RATING THAN DOWNSTREAM DEVICES.

22.9 THE HYDRO METERING CURRENT TRANSFORMER COMPARTMENT, WHERE REQUIRED, SHALL HAVE A REMOVABLE STEEL MOUNTING PLATE AND SHALL BE EQUIPPED WITH ALL HARDWARE AND BUS DUCT TO RECEIVE THE LOCAL UTILITIES CURRENT AND POTENTIAL TRANSFORMERS. CURRENT TRANSFORMERS SHALL BE OBTAINED FROM THE UTILITY AND INSTALLED IN THE COMPARTMENT BY THE SERVICE ENTRANCE BOARD MANUFACTURER OR AS PER UTILITIES STANDARD REQUIREMENTS.

22.10 THE ENTIRE PANEL, BUSWORK AND CONNECTIONS SHALL BE TO THE UTILITIES APPROVAL. OBTAIN THEIR REQUIREMENTS PRIOR TO INSTALLATION. SUBMIT METERING DETAILS TO THE LOCAL DISTRIBUTION COMPANY TO OBTAIN APPROVAL OF THE METERING EQUIPMENT PRIOR TO ORDERING EQUIPMENT.

22.11 MAIN SWITCHBOARD SHALL INCLUDE MAIN DIGITAL DEMAND METER, APPROVED DIGITAL METERS ARE: JANITZA UMG508, ACUVIM MODEL IIR-D-5A-P1, OR EQUIVALENT. THE DEMAND METER MAY BE SEPARATELY INSTALLED IN OWN ENCLOSURE NEXT TO THE MAIN SERVICE BOARD OR BE PART OF THE BOARD. INCLUDE FOR ENCLOSURE, CT'S, SEPARATE CONTROL POWER TRANSFORMER C/W FUSE KIT AS REQUIRED. THE DIGITAL DEMAND METER SHALL BE A TURN KEY PRODUCT BY THE ABOVE OR EQUIVALENT VENDORS.

22.12 SWITCHBOARD SHALL BE VERMIN PROOF, SPRINKLER PROOF AND ON A MINIMUM 4" CONCRETE HOUSEKEEPING PAD AND UPSIZED AS REQUIRED FOR SEISMIC CONSTRUCTION.

22.13 SERVICE ENTRANCE BOARD SHALL HAVE A MINIMUM OF 50KA (AIC) RATING.

22.14 PROVIDE A LOCKABLE HINGED SPARE FUSE CABINET IN EACH ELECTRICAL ROOM. PROVIDE A MINIMUM OF THREE (3) - SPARE FUSES OF EACH SIZE USED. PROVIDE INVENTORY, MOUNTED ON THE INSIDE OF THE CABINET.

23. TRANSFORMERS:

23.1 DRY TYPE DISTRIBUTION TRANSFORMERS SHALL BE OF ALUMINUM WINDINGS, INDOOR AIR-COOLED TYPE RATED THREE PHASE 6O CYCLE, OF KVA, VOLT & AMP RATING AS SHOWN ON THE DRAWINGS. 1.2KV CLASS AND CAPABLE OF WITHSTANDING A 10KV BASIC IMPULSE LEVEL (BIL). THEY SHALL HAVE STANDARD PRIMARY TAPS. THE TRANSFORMER SHALL BE DESIGNED WITH A CLASS B OR H INSULATION SYSTEM.

23.2 THE SOUND LEVEL IN DECIBELS SHALL BE IN ACCORDANCE WITH NEMA TRI CURRENT STANDARDS. THE TRANSFORMER SHALL BE EQUIPPED WITH TERMINAL BOARDS, TAP CHANGING LINKS, SUITABLE SOLDERLESS CONNECTORS AND SHALL HAVE A VENTILATED CODE GAUGE STEEL ENCLOSURE COMPLETE WITH HINGED REMOVABLE EXPANDED METAL SIDE PANELS AND MOUNTING BRACKETS FOR FLOOR OR WALL MOUNTING AS SHOWN. MOUNT ALL TRANSFORMERS 75KVA AND SMALLER AT HIGH LEVEL IN LOCATION SHOWN UNLESS OTHERWISE NOTED.

23.3 TRANSFORMERS 112.5KVA OR LARGER SHALL BE PLACED ON A HOUSED KEEPING PAD (UNLESS OTHERWISE NOTED) AS SPECIFIED IN SECTION 22.12.

23.4 THE COMPLETED ASSEMBLY SHALL BE PAINTED WITH A PRIMER COAT AND A FINISH COAT OF ASA#61 GRAY. THE TRANSFORMER SHALL CONFORM TO C.S.A-0802.2, NEMA TRI AND CEMA L2 CURRENT STANDARDS EXCEPT WHERE NOTED AND SHALL BE APPROVED TO C.S.A CODE PART 2 SPECIFICATION 022.2 NO.47 WHERE APPLICABLE.

23.5 TRANSFORMERS SHALL BE SPRINKLER PROOF AS REQUIRED TO MEET LOCAL AND HYDRO CODES.

23.6 COMPLETE TRANSFORMER CONNECTION BY USE OF FLEXIBLE CONDUITS TO ALLOW FOR VIBRATION ISOLATION.

24. METERING

24.1 METERING CABINETS SHALL BE OF SIZE SHOWN ON DRAWING OR AS REQUIRED WITH REMOVABLE STEEL METER MOUNTING PLATE, TWO DOORS AND SEALING HASPS TO UTILITY APPROVAL. PROVIDE A CAT.6 WIRED TELEPHONE LINE FROM EACH METER CABINET TO THE MAIN TELEPHONE ENTRY POINT AS REQUIRED BY THE LOCAL DISTRIBUTION COMPANY METERING DEPARTMENT.

24.2 METER SOCKET BASE SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. FOR ELECTRICAL SERVICES 400 AMP AND HIGHER COMBINATION OF METER CABINET AND SEPARATE METER BASE ARE REQUIRED.

24.3 THE CABINET SHALL BE MOUNTED ON THE WALL AS SHOWN ON THE DRAWINGS AND TO THE SATISFACTION OF THE LOCAL UTILITY. METER SOCKETS SHALL BE TO APPROVAL OF UTILITY.

24.4 THE CONTRACTOR SHALL CONFIRM METERING REQUIREMENTS WITH LOCAL HYDRO METERING DEPARTMENT PRIOR TO WORK COMMENCEMENT AND METERING EQUIPMENT SUPPLY.

24.5 PROVIDE ALL REQUIRED NEUTRAL WIRES TO METER AS PER LOCAL HYDRO'S REQUIREMENT.

24.6 COORDINATE AND PAY FOR ANY HYDRO SERVICE COSTS AS REQUIRED, INCLUDE FOR COORDINATION AND MEETING WITH UTILITY DISTRIBUTION COMPANY.

24.7 METERING EQUIPMENT SHALL BE PRE-APPROVED BY LOCAL HYDRO METERING DEPARTMENT. OBTAIN APPROVAL BY AHJ.

25. MISCELLANEOUS ELECTRICAL WORK:

25.1 PROVIDE ALL CONCRETE WORK REQUIRED FOR ELECTRICAL WORK IN ACCORDANCE WITH ELECTRICAL AND ARCHITECTURAL DIVISION OF SPECIFICATION. THIS INCLUDES HOUSEKEEPING PAD BELOW ALL FLOOR STANDING EQUIPMENT.

25.2 PROVIDE ALL NECESSARY DUCT BANKS AS REQUIRED BY HYDRO IN ACCORDANCE WITH THEIR SPECIFICATIONS. SUBMIT ALL NECESSARY DRAWINGS TO HYDRO FOR THEIR APPROVAL.

25.3 CONFIRM ALL LOCATIONS AND OUTLETS PRIOR TO INSTALLATION. ALLOW TO RELOCATE ANY OUTLET WITH 5 METERS OF SPECIFIED LOCATION PRIOR TO INSTALLATION.

25.4 COORDINATE LOCATION OF TENANT ELECTRICAL SERVICE WITH TENANT INTERIOR DETAILS PRIOR TO SERVICE INSTALLATION. REQUEST FROM GENERAL CONTRACTOR TENANT INTERIOR DRAWINGS FOR COORDINATION PURPOSES.

25.5 PROVIDE ALL REQUIRED LUGS, CONNECTORS, REDUCERS, CRIMP, PIGTAIL, ADAPTERS. ANY REQUIRED CONNECTING MATERIAL TO ENSURE CONDUCTORS COMPATIBLE WITH TERMINATOR REQUIREMENTS OF THE EQUIPMENT.

26. INTERRUPTION AND CONTINUATION OF SERVICES:

26.1 INTERRUPTION OF ELECTRICAL SERVICES SHALL OCCUR ONLY BY PRE-ARRANGEMENT AT TIMES SUITABLE TO THE LANDLORD.

26.2 INTERRUPTIONS SHALL ONLY OCCUR DURING PREMIUM TIME PERIODS; ALL ALLOWANCES FOR THIS SHALL BE INCLUDED IN THE PRICE SUBMITTED.

26.3 WORK IDENTIFIED TO BE CARRIED OVER BY LOCAL HYDRO UTILITY, SHALL BE COMPLETED WITH ASSISTANCE BY THIS ELECTRICAL CONTRACTOR, AT A TIME CONVENIENT TO HYDRO COMPANY. INCLUDE FOR WORK AT PREMIUM TIME AS REQUIRED.

27. N/A

28. N/A

29. N/A

30. SEISMIC RESTRAINT:

30.1 PROVIDE ALL MATERIALS AND LABOUR NECESSARY TO SUPPLY AND INSTALL SEISMIC RESTRAINTS AND ANCHORAGE FOR ALL ELECTRICAL EQUIPMENT INCLUDING, BUT NOT LIMITED TO, SWITCHGEAR, TRANSFORMERS, STANDBY GENERATORS, LIGHT FIXTURES, BATTERY PACKS, CONDUITS, RACEWAYS, BUS DUCTS, ETC., TO CONFIRM WITH LOCAL BUILDING CODE AND ALL OTHER APPLICABLE REGULATIONS.

30.2 CONTRACTOR SHALL RETAIN AND PAY FOR A REGISTERED SEISMIC ENGINEER TO DESIGN AND INSPECT THE SEISMIC RESTRAINTS OF THE ELECTRICAL SYSTEM COMPONENTS COVERED UNDER DIVISION 16 FOR THIS CONTRACT.

30.3 THE SEISMIC ENGINEER RETAINED BY CONTRACTOR SHALL PROVIDE FOR THE FOLLOWING:

30.3.1 SIGNED AND SEALED LETTERS OF ASSURANCE OF PROFESSIONAL DESIGN AND COMMITMENT FOR FIELD REVIEW AND SUMMARY OF DESIGN AND FIELD REVIEW AS REQUIRED BY AUTHORITIES HAVING JURISDICTION.

30.3.2 CERTIFIED DETAILED DRAWINGS OF SEISMIC RESTRAINTS.

30.3.3 DETAILED SPECIFICATION FOR SEISMIC RESTRAINTS AND HOUSEKEEPING PAD DESIGN REQUIREMENTS FOR EQUIPMENT SUPPORT.

30.3.4 WRITTEN REPORTS OF SITE REVIEWS.

30.3.5 SIGNED AND SEALED LETTER OF ASSURANCE OF PROFESSIONAL REVIEW AND COMPLIANCE.

30.4 SUBSTANTIAL PERFORMANCE WILL NOT BE CONSIDERED WITHOUT THE SUBMISSION OF THE ABOVE DOCUMENTS. ALL THE ABOVE DOCUMENTS SHALL BE SUBMITTED TO THE CONSULTANT FOR FURTHER DISTRIBUTION AND FILES.

30.5 THE CONTRACTOR SHALL COOPERATE WITH THE SEISMIC ENGINEER AND PROMPTLY SUPPLY SUCH INFORMATION, INCLUDING WEIGHTS OF EQUIPMENT AND BASE FRAME OR MOUNTING PLATE LAYOUTS, AS REQUESTED BY THE SEISMIC ENGINEER NECESSARY TO SUPPORT THE DESIGN AND DETAILS FOR SEISMIC RESTRAINT.

30.6 THE CONTRACTOR SHALL NOT BE ENTITLED TO ANY ADDITIONAL COMPENSATION ARISING FROM THE TECHNICAL DIRECTION PROVIDED BY THE SEISMIC ENGINEER FOR SEISMIC RESTRAINT AND ANCHORAGE OF ELECTRICAL SYSTEMS.

30.7 CONTRACTORS AND SEISMIC RESTRAINT ENGINEER SHALL NOTE SPECIFIC STRUCTURAL DESIGN AND CONSTRUCTION REQUIREMENTS FOR THIS BUILDING AND SHALL DESIGN AND INSTALL THE SEISMIC RESTRAINT SYSTEM TO SUIT.

31. N/A

32. HAZARDOUS LOCATIONS:

32.1 ALL WIRING IN AREAS/ZONES CLASSIFIED AS HAZARDOUS SHALL BE COMPLETED WITH RIGID STEEL PIPING AND IN ACCORDANCE TO SECTION 18 OF OESC. TECK WIRING WILL NOT BE ACCEPTED.

33. APPROVED MANUFACTURERS:

33.1 SWITCHBOARD AND ELECTRICAL PANELS: EATON, SQUARE D, GE AND SIEMENS.

33.2 METER CENTERS: EATON AND SQUARE D

33.3 LV TRANSFORMER: REX, MARCUS, SQUARE D, HAMMOND, SIEMENS AND GE.

34. SPECIFICATION GUIDELINES:

34.1 ELECTRICAL SPECIFICATION IS APPLICABLE TO ALL ITEMS SHOWN ON THE ELECTRICAL DRAWINGS.

34.2 SPECIFICATION REFERENCING EQUIPMENT BEYOND THE SHOWN ON THE DRAWINGS SHALL BE DISCARDED.

SITE SERVICE & DUCTBANK SPECIFICATIONS

1. UNDERGROUND DUCT BANKS:

1.1 SUPPLY AND INSTALL UNDERGROUND CONCRETE ENCASED DUCTBANKS FOR CABLES INDICATED. CONCRETE WORK AS DETAILED HEREIN SHALL BE PROVIDED BY THIS SECTION. TRENCHING AND BACKFILLING SHALL BE DONE BY THIS SECTION.

1.2 DUCTBANKS SHALL FOLLOW GENERAL ROUTE SHOWN ON THE DRAWINGS AND SHALL TERMINATE AT SPECIFIED LOCATIONS. EXACT LOCATION OF DUCTBANKS AND TERMINATING POINTS SHALL BE VERIFIED ON THE SITE PRIOR TO COMMENCEMENT OF WORK.

1.3 THE DUCTBANK SHALL CONSIST OF PARALLEL DUCTS ENCASED IN CONCRETE. THE NUMBER AND ARRANGEMENT OF DUCTS SHALL BE AS SHOWN ON THE DRAWINGS. DUCTS SHALL BE CSA CERTIFIED TYPE DBII POLYVINYL FOR CONCRETE ENCASEMENT OR DIRECT BURIAL, WITH AN INTERNAL DIAMETER OF FOUR INCHES MINIMUM UNLESS OTHERWISE SHOWN ON THE DRAWINGS.

1.4 BENDS SHALL GENERALLY BE AS FACTORY SUPPLIED OF APPROVED RADIUS. RADIUS OF SUCH BENDS SHALL NOT BE LESS THAN STANDARD FOR THE 100MM DIAMETER DUCT 1M.

1.5 THE DUCT LENGTHS SHALL BE JOINED TOGETHER WITH AN APPROVED COUPLING TO PROVIDE A SOUND JOINT. ADJACENT COUPLINGS SHALL BE STAGGERED BY AT LEAST 200MM. JOINT SOLVENT SHALL BE USED TO SEAL THE COUPLINGS.

1.6 WHERE TRENCH IS DRY AND FIRM, NO BED SHALL BE REQUIRED. WHERE TRENCH IS WET, SUPPLY AND INSTALLED 150MM LAYER OF CRUSHED STONE IN THE BOTTOM. NO CONCRETE SHALL BE POURED IN TRENCHES CONTAINING WATER.

1.7 THE DUCTS SHALL BE LAID WITH A MINIM SPACING OF 150MM CENTER TO CENTER, BOTH HORIZONTALLY AND VERTICALLY FOR 100MM DIAMETER. FOR LARGER DUCTS, SPACING SHALL BE INCREASED CORRESPONDINGLY. SPACERS SHALL BE INSTALLED ON 3M CENTERS AND WITHIN 600MM OF EACH COUPLING USED. SPACERS SHALL BE SPECIALLY FORMED PLASTIC. WOOD SPACERS SHALL NOT BE USED.

1.8 THE DUCTS SHALL BE ON EVEN GRADE SLOPED NOT LESS THAN 20MM IN A 1000MM RUN IN DIRECTION OPPOSITE TO THE ELECTRICAL ROOM. PRIOR ENTRANCE INTO ELECTRICAL ROOM DUCTS SHALL BE DRAINED VIA FRENCH DRAIN IF SLOPE OPPOSITE TO ELECTRICAL ROOM IS NOT FEASIBLE.

1.9 THE TOP SURFACE OF CONCRETE ENCASEMENT SHALL BE A MINIMUM 760MM BELOW FINISHED GRADE, UNLESS OTHERWISE INDICATED ON THE DRAWING, BUT IN NO CASE SHALL IT BE LESS THAN 600MM TO THE FINISHED GRADE OR SURFACE. HIGH VOLTAGE DUCTS SHALL HAVE MINIMUM 1000MM OF 98% COMPACTED SOIL OR NATIVE MATERIAL OVER THEM.

1.10 NO FERROUS METAL SHALL BE INSTALLED BETWEEN PRIMARY CABLE DUCTS. RE-ENFORCING SHALL BE INSTALLED ONLY NEAR THE BOTTOM OF THE DUCT UNLESS SPECIFICALLY INDICATED OTHER OR REQUIRED BY A LOCAL HYDRO AUTHORITY. WHERE THE DUCTBANK IS CONSTRUCTED OVER RECENT FILL OR UNSTABLE GROUND, OR PASSES THROUGH WALLS OR FOOTINGS, OR UNDER DRIVEWAYS OR PARKING 5 LOTS, THE CONCRETE SHALL BE REINFORCED WITH " DIAMETER 8 HI-BOND STEEL BARS LAID LONGITUDINALLY AT 150MM LATERAL 2 SPACING AND SET AT THE DEPTH OF THE CONCRETE ENVELOPE 3 BELOW THE BOTTOM ROW OF DUCTS.

1.11 ALL REINFORCING RODS USED SHALL HAVE A MINIMUM LENGTH OF 2000MM. INDIVIDUAL LENGTHS OF REINFORCING RODS ARE TO BE OVERLAPPED BY A MINIMUM OF 300MM AND IS TO EXTEND AT LEAST 1000MM ONTO SOLID GROUND. IN ALL CASES WHERE THE DUCT BANK ENTERS A BUILDING, IT SHALL BE REINFORCED FOR A DISTANCE OF 2500MM OUTSIDE THE BUILDING. DUCTBANKS PASSING BENEATH OR THOUGH BUILDING FOOTINGS, UNDER HIGHWAYS, STREETS, ROADS, OR HEAVILY TRAVELED DRIVEWAYS SHALL BE REINFORCED, AND REINFORCING SHALL EXTEND A DISTANCE OF 1500MM BEYOND IN BOTH DIRECTIONS.

1.12 THE DUCTS SHALL BE ENCASED WITH A MINIMUM 24MPA CONCRETE WITH A MINIMUM COVER OF 75MM ON ALL SIDES. THE CONCRETE SHALL HAVE A SLUMP OF 100MM TO 150MM AND BE OF A PEA GRAVEL AGGREGATE. TO PREVENT ANY DISPLACEMENT OF THE DUCT STRUCTURE DURING POURING, THE DUCT STRUCTURE SHALL BE BRACED DOWN EVERY 3000MM AND THE CONCRETE SHALL BE DEFLECTED DOWN ALONGSIDE THE DUCTS TO THE BOTTOM AND UP THROUGH THE DUCT ASSEMBLY.

1.13 WHEN CROSSING OTHER UTILITIES, THE CONCRETE DUCT ENCASEMENT SHALL MAINTAIN A MINIMUM OF 450MM VERTICAL CLEARANCE. WHEN RUNNING PARALLEL TO ANOTHER UTILITY, THE DUCTBANK SHALL BE A MINIMUM OF 1500MM CLEAR OF SAID UTILITY BUT IN NO CASE SHALL IT BE INSTALLED IN THE SAME EXCAVATION.

1.14 WHEN COMPLETED, THE DUCTS SHALL BE CLEANED AND ENDS PLUGGED WITH DUCT PLUGS. THE DUCTS SHALL BE TESTED FOR CLEARANCE BY PULLING A STEEL WIRE BRUSH AND A 95MM MANDREL THROUGH THEIR COMPLETE LENGTH.

1.15 DUCTS INSTALLED FOR P.U.C CABLES AND DUCTS LEFT AS SPARE SHALL HAVE ONE CONTINUOUS LENGTH 10MM POLYPROPYLENE ROPE INSTALLED IN EACH DUCT TO FACILITATE THE INSTALLATION OF THE CABLES IN THE DUCT. TERMINATION POINTS, GRADES, AND ROUTE OF DUCT BANK SHALL BE CONFIRMED BY THE P.U.C ON-SITE.

1.16 NOTIFY CONSULTANT AND P.U.C AT LEAST 48 HOURS BEFORE CONCRETE IS POURED TO PERMIT INSPECTION OF THE DUCT INSTALLATION.

1.17 ASSUME RESPONSIBILITY TO HAVE THE DUCTS INSPECTED BY THE INSPECTION OFFICE AND P.U.C (WHERE APPLICABLE) PRIOR TO POURING OF CONCRETE AND AGAIN PRIOR TO BACKFILLING.

2. EXCAVATION AND BACKFILLING:

2.1 EXCAVATE AND BACKFILL AS REQUIRED FOR THIS WORK BOTH INSIDE AND OUTSIDE THE BUILDING. ALL TRENCH EXCAVATION SHALL BE CARRIED OUT IN STRICT CONFORMITY WITH THE TRENCH EXCAVATOR PROTECTION ACT AND AMENDMENTS, STATUTES OF ONTARIO AND REGULATIONS, AS REVISED AND AMENDED TO DATE.

2.2 ALL EXCAVATION AND BACKFILLING SHALL BE PROVIDED BY THIS ELECTRICAL CONTRACTOR.

2.3 CAREFULLY CHECK AND AVOID DISTURBING OR DAMAGING ANY EXISTING UNDERGROUND PIPING, CONDUIT OR OTHER SERVICES UNCOVERED DURING CARRYING OUT OF THE WORK. MAKE GOOD ANY DAMAGE.

2.4 UNDERGROUND SEWERS AND OTHER SERVICES ARE INDICATED APPROXIMATELY ON THE MECHANICAL, ELECTRICAL, OR ARCHITECTURAL SITE PLANS. THE LOCATION OF SUCH SERVICES HAS BEEN DETERMINED FROM AVAILABLE INFORMATION BUT HAS NOT BEEN VERIFIED IN THE FIELD. CAREFULLY CHECK SUCH DISCREPANCY BEFORE PROCEEDING WITH ANY NEW WORK. ENGAGE THE SERVICES OF LOCAL P.U.C, HYDRO, TELEPHONE, AND GAS AUTHORITIES TO ACCURATELY DETERMINE LOCATION OF ANY UNDERGROUND UTILITIES.

2.5 EXCAVATION FOR ALL UNDERGROUND SERVICES SHALL BE OF THE REQUIRED DEPTH AND DIMENSION, AND SHALL BE:

2.5.1 PREPARED AS REQUIRED, SO THAT NO PORTION OF ANY DUCT SHALL BEAR DIRECTLY AGAINST ANY ROCK OR OTHER HARD SURFACE.

2.5.2 KEPT DRY AT ALL TIMES BY BAILING, PUMPING, OR OTHER MEANS. SIDES AND BOTTOMS SHALL BE KEPT FROM FREEZING.

2.5.3 BOTTOMS OF EXCAVATION SHALL BE GRADED AS REQUIRED.

2.5.4 BANKS OF EXCAVATIONS SHALL BE EVENLY CUT AND/OR TRIMMED AND THEY SHALL BE SHORED AS REQUIRED TO PREVENT CAVING IN, AND THE MATERIAL USED SHALL BE CAREFULLY DRAWN DURING BACKFILLING.

2.5.5 WIDTH OF EXCAVATION SHALL BE CAREFULLY CONTROLLED AND SHALL BE LIMITED TO TWICE THE O.D OF DUCTS, CONDUITS OR DUCTBANK, AND AS SHOWN ON THE DRAWINGS.

2.5.6 EXCAVATING, DUCT LAYING, AND BACKFILLING SHALL BE EXECUTED IN LIMITED LENGTH AS DETERMINED BY PROJECT MANAGER TO ENABLE ALL PROTECTIVE MEASURES TO FUNCTION EFFICIENTLY AT ALL TIMES.

2.6 WHERE EXCAVATING IS NECESSARY IN CLOSE PROXIMITY TO AND BELOW ANY FOOTING LEVEL, BACKFILLING SHALL BE DONE WITH REINFORCED CONCRETE FURNISHED UNDER THIS SECTION TO THE LEVEL OF THE TOP OF HIGHEST ADJACENT FOOTING.

2.7 ALL DUCTS ENTERING AND LEAVING THE BUILDING OR PASSING OTHER EXCAVATED AREAS SHALL BE SUPPORTED ON A REINFORCED CONCRETE PAD, RESTING AT BOTH ENDS ON AT LEAST 1800MM SOLID UNDISTURBED EARTH OR A CHECK IN CONCRETE FOUNDATION WALL.

2.8 IN AREAS WHERE REINFORCED SUSPENDED SLAB IS INDICATED ON STRUCTURAL DRAWINGS, DUCTS SHALL BE SUPPORTED FROM REINFORCING RODS.

2.9 SHOULD THE EXCAVATION BY NEGLIGENCE OR ERROR BE CARRIED TO GREATER DEPTH THAN SHOWN OR AUTHORIZED, SUCH EXTRA EXCAVATION SHALL BE REPLACED WITH WELL-COMPACTED GRANULAR B CRUSHED STONE FILL OR REINFORCED CONCRETE, AS REQUIRED TO GIVE A BEARING VALUE EQUAL TO THAT PROVIDED BY ADJACENT SOIL.

2.10 BACKFILLING SHALL NOT BE COMMENCED UNTIL INSTALLATION IS INSPECTED AND APPROVED. BACKFILLING SHALL BE CARRIED OUT CAREFULLY TO AVOID INJURY TO THE WORK AND SUBSEQUENT SETTLEMENT AND SHALL BE EXECUTED AS FOLLOWS:

2.10.1 ALL BACKFILLING REQUIRED TO BRING LEVEL UP TO UNDERSIDE OF STONE FILL (UNDER PARKING AREAS, AND ROADS), AND TO UNDERSIDE OF SIDEWALK SHALL BE GRANULAR B MATERIAL, SUPPLIED UNDER THIS SECTION AND TAMPED EVERY 150MM IN DEPTH TO CONSOLIDATE. SAID FILL SHALL BE CLEAN, SHALL NOT HAVE PARTICLES OVER 65MM IN LARGEST DIMENSIONS, AND WITH NOT MORE THAN 8% PASSING A #200 SIEVE.

2.10.2 ALL BACKFILL PLACED UNDER PAVED AREAS (PARKING AREAS, DRIVEWAYS, SIDEWALKS, ETC.) SHALL BE COMPACTED IN 150MM TO 200MM LAYERS TO 98% SPDD (REFER TO GENERAL REQUIREMENTS OUTLINED IN SPECIFICATION SECTION 02315 & SOIL REPORT). TESTING AND INSPECTION OF SAID BACKFILL INCLUDING CHECKING THE PLACING AND COMPACTION OF FILL, SHALL BE DONE BY AN INDEPENDENT INSPECTION TESTING COMPANY. THE COST OF THE INSPECTION AND TESTING OF THIS FILL WILL BE PAID BY OTHERS. ONE TEST SHALL BE MADE (EVERY 2 LAYERS OF FILL) FOR EACH 5,000 SQUARE FEET OR LESS OF FILLED AREAS FOR DRIVEWAYS, PARKING AREAS, AND SIDEWALKS.

2.10.3 EXTERIOR BACKFILL IN AREAS TO RECEIVE SOD OR SEED SHALL BE CLEAN FILL, FREE FROM ORGANIC MATERIAL AND DEBRIS, PLACED IN A MAXIMUM 300MM LAYER AND COMPACTED TO ACHIEVE 90% DRY DENSITY AS DETERMINED BY THE STANDARD AASHO TEST. FROZEN EARTH SHALL NOT BE USED FOR BACKFILLING NOR SHALL ANY BACKFILLING BE PLACED ON OR AGAINST FROZEN GROUND.

2.10.4 BACKFILL TRENCHES WITHIN BUILDING AND GRANULAR B CRUSHED STONE IN LAYERS AND COMPACT TO 100% STANDARD PROCTOR DENSITY.

2.10.5 SUPPLY AND INSTALL A 150MM WIDE PLASTIC FILM 200MM BELOW FINISHED SURFACE OR GRADE TO MARK THE LOCATION OF DUCTS, CABLES AND CONDUITS. FILM SHALL BE MANUFACTURED BY GRIFFOLYN OR EQUAL, AND SHALL CONTAIN CONTINUOUS PRINTED WARNING AND MESSAGE DESIGNATING SERVICE BURIED. FILM SHALL BE ORANGE FOR POWER LINES, AND GREEN FOR COMMUNICATIONS LINES.

2.10.6 IF SETTLEMENT OCCURS, IT SHALL BE MADE UP AS SOON AS POSSIBLE SO THAT REGULAR TRAFFIC IN AND AROUND THE WORK WILL NOT BE INCONVENIENCED. AFTER A PERIOD ADEQUATE TO REVEAL THAT SETTLEMENT HAS PASSED, FILL ALL DEPRESSIONS TO RESTORE THE CORRECT GRADE.

2.10.7 PATCHING OF ALL PAVED AREAS, ROADS, WALKS, SODDING, ETC, DAMAGED BY THE NEW WORK WILL BE DONE BY ANOTHER DIVISION AND PAID BY THIS ELECTRICAL CONTRACTOR.

2.10.8 BE RESPONSIBLE FOR MAKING GOOD ANY SUBSEQUENT SETTLEMENT OF FILL AND PAY ALL COSTS INVOLVED IN MAKING GOOD PAVING, CURBS, AND ALL OTHER SURFACE RESTORATIONS.

2.10.9 BACKFILLING TO SUB-GRADE LEVEL BY THIS ELECTRICAL CONTRACTOR AND FINISH BACKFILLING SHALL BE DONE BY PAVING CONTRACTOR.

2.10.10 EXCAVATED MATERIALS SHALL BE PILED, STORED AND/OR DISPOSED OF AS FOLLOWS:

2.10.10.1 DURING THE PROCESS OF THE CONTRACT, IN SUCH PLACES AND IN SUCH A MANNER THAT A MINIMUM OF DAMAGE OR DISFIGUREMENT OF EXISTING GROUND WILL RESULT.

2.10.10.2 ON COMPLETION OF WORK, ALL EXCAVATED MATERIAL SHALL BE REMOVED AND DEPOSED OF.

DRAWING LIST

NO.	DESCRIPTION
ES1	ELECTRICAL SPECIFICATIONS
ES2	ELECTRICAL SITE PLAN - OVERALL
ES2.1	ELECTRICAL SITE PLAN - PART 1
ES2.2	ELECTRICAL SITE PLAN - PART 2
ES3	ELECTRICAL NOTES & DETAILS
ES4	ELECTRICAL HYDRO OTTAWA DETAILS

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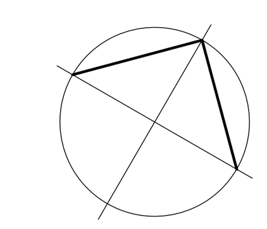
THESE DRAWINGS ARE NOT TO BE SCALED FOR SITE DIMENSIONS. THE CONTRACTOR MUST CHECK AND VERIFY ALL DIMENSIONS AND SITE CONDITIONS AT THE PROJECT SITE AND MUST REPORT ANY DISCREPANCIES TO THE CONSULTANTS BEFORE PROCEEDING WITH THE WORK.

COORDINATE ALL OF THE WORK WITH OTHER TRADES & THE LAYOUTS SHOWN ON THE OTHER CONSULTANTS AND THE ARCHITECTURAL DRAWINGS (WHERE APPLICABLE). REFER TO THE APPROPRIATE CONSULTANT DRAWINGS BEFORE PROCEEDING WITH THE WORK FOR ANY COORDINATION REQUIREMENTS.

THIS CONTRACTOR MUST CONFORM TO ALL APPLICABLE CODES AND STANDARD REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION. THE CONTRACTOR SHALL WORK FROM DRAWINGS MARKED 'ISSUED FOR CONSTRUCTION' AND SHALL ENSURE LATEST ISSUED INSTRUCTIONS ARE FOLLOWED. THIS CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY AND
BEAR COSTS FOR ANY CORRECTIONS OR DAMAGES RESULTING FROM THEIR WORK.

North



Revisions

No.	By	Description	Date
01	BK	ISSUED FOR UTILITY	2025-09-11

Project

WO MW REALTY LIMITED OFFICE GROUP SITE PLAN APPLICATION NEW MILLER WASTE FACILITY

3145 CONROY ROAD, OTTAWA, ON

Drawing

ELECTRICAL SPECIFICATIONS

Scale: N.T.S.

Stamp

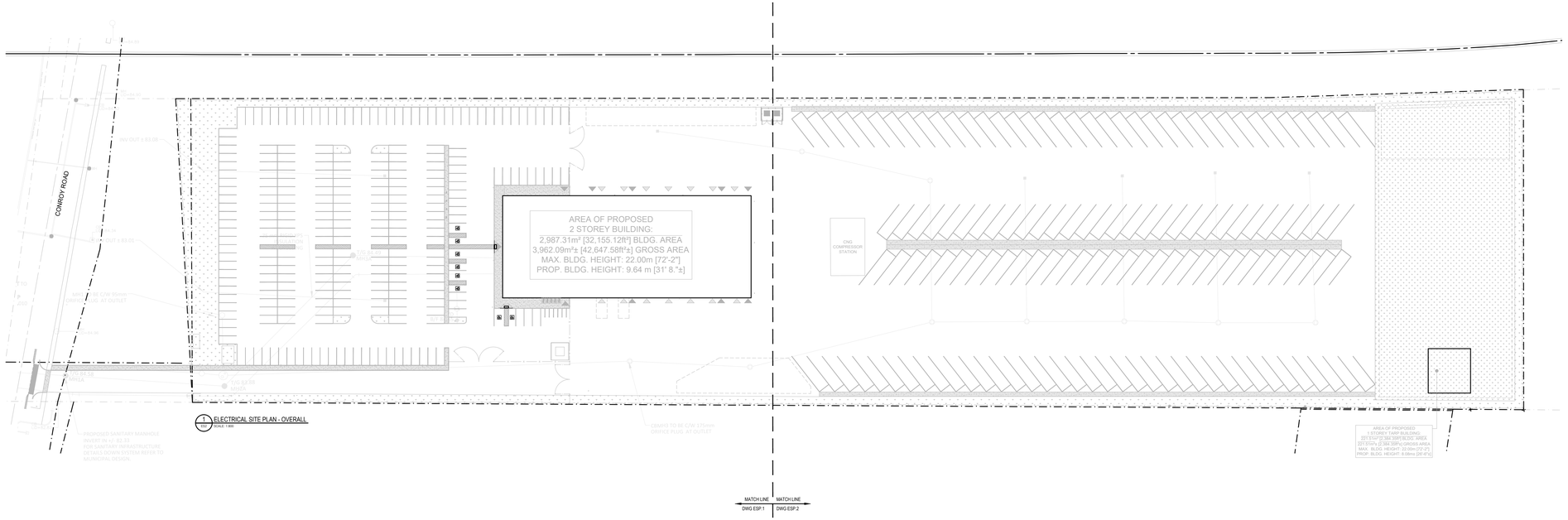
Drawn: BD

Checked: BK

Project No.: 25-000-087

Drawing No.: ES1

Date: MAY 2025



1 ELECTRICAL SITE PLAN - OVERALL
SCALE: 1:800

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WO MW REALTY LIMITED
OFFICE GROUP
SITE PLAN APPLICATION
NEW MILLER WASTE FACILITY

3145 CONROY ROAD, OTTAWA, ON

Drawing

ELECTRICAL
SITE PLAN - OVERALL

Scale: AS NOTED

Drawn: BD

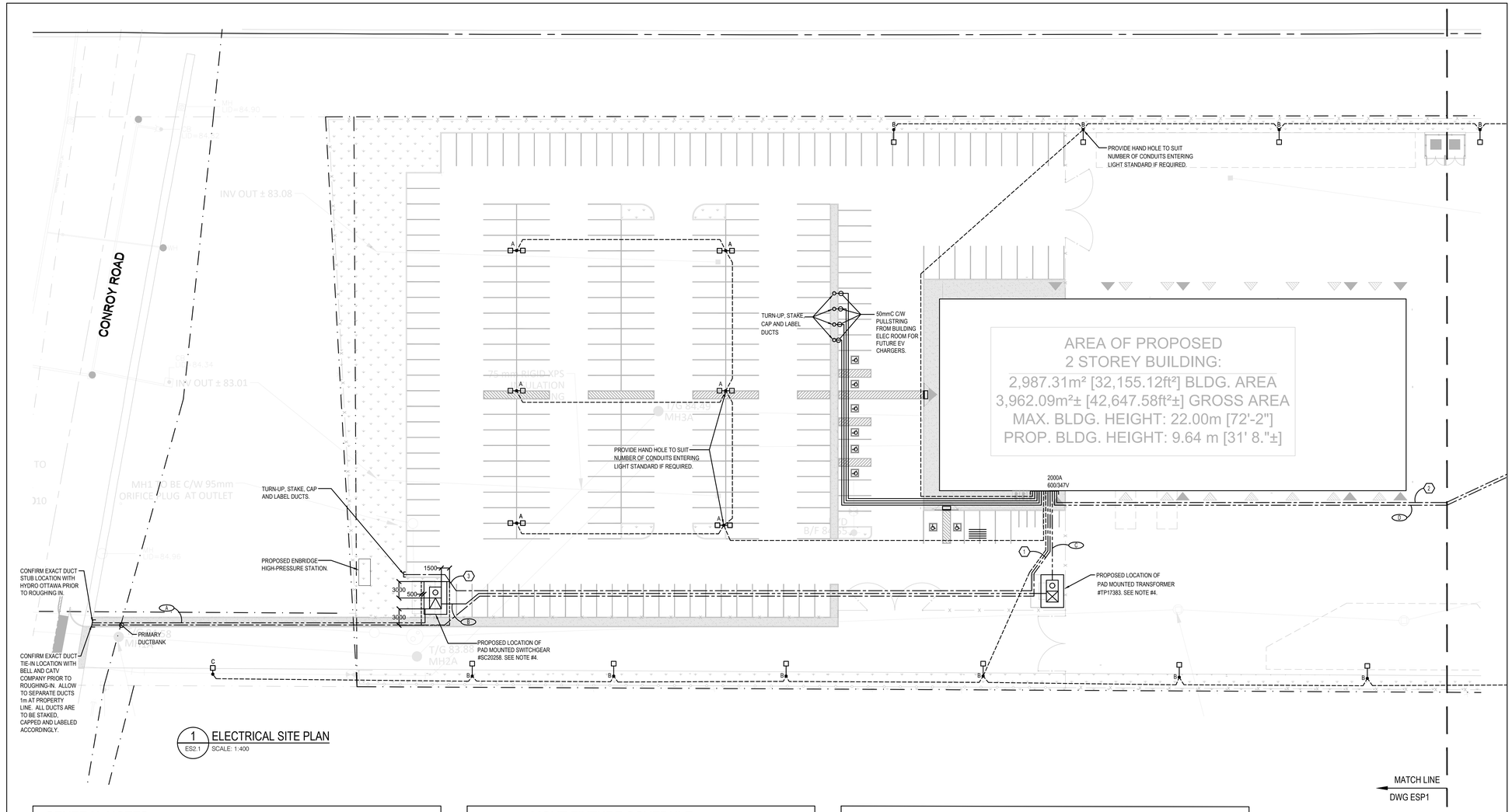
Checked: BK

Stamp

Project No.: 25-000-087

Date: MAY 2025

Drawing No.: ES2



1 ELECTRICAL SITE PLAN
ES2.1 SCALE: 1:400

GENERAL NOTES

1. THIS ELECTRICAL CONTRACTOR TO RUN CONCRETE ENCASED STEEL REINFORCED (CESR) PRIMARY DUCTBANKS (QUANTITY AND SIZE AS SHOWN ON DRAWING) TO APPROVAL OF HYDOR OTTAWA. ALL DUCTS TO BE C/W PULLSTRINGS.
2. THIS ELECTRICAL CONTRACTOR TO RUN CONCRETE ENCASED STEEL REINFORCED (CEST) SECONDARY / FEEDER DUCTBANKS (QUANTITY AND SIZE AS SHOWN ON DRAWING) TO BUILDING ELECTRICAL ROOM. ALLOW TO COORDINATE WITH BUILDING ELECTRICAL CONTRACTOR FOR ALL CONNECTIONS TO MAIN SWITCHBOARD. PROVIDE 30' COIL OF CABLE IN TRANSFORMER FOUNDATION FOR CONNECTION BY HYDRO OTTAWA. CONFIRM EXACT LENGTH OF SECONDARY CABLE ON SITE PRIOR TO ORDERING. COORDINATE CONNECTIONS AT TRANSFORMER WITH HYDRO OTTAWA ON SITE.
3. THIS ELECTRICAL CONTRACTOR TO VERIFY EXACT LOCATION OF ALL ELECTRICAL ROOMS PRIOR TO ROUGH-IN SECONDARY SERVICES.
4. PROPOSED LOCATION OF PAD MOUNTED TRANSFORMER OR SWITCHGEAR. PROVIDE FOUNDATION, LID, GROUNDING, PROTECTIVE BOLLARDS ETC... TO HYDRO OTTAWA STANDARDS AND REQUIREMENTS. REFER TO DRAWING ES4 FOR HYDRO OTTAWA DETAILS.
5. THIS ELECTRICAL CONTRACTOR TO COORDINATE WITH CIVIL DRAWINGS TO AVOID CONFLICT AND ADJUST ROUTING AS REQUIRED.
6. ALL EMPTY DUCTS SHALL BE C/W NYLON PULL ROPES AND LABELED AT BOTH ENDS.
7. THIS ELECTRICAL CONTRACTOR TO RUN BOTH CONDUIT / WIRING FOR SITE LIGHTING ALL THE WAY INTO EACH LANDLORD ELECTRICAL ROOM AS SHOWN AND TERMINATE IN J-BOX UNDER HOUSE SERVICE 347/600V PANEL. LEAVE 15' COIL OF CABLES IN J-BOX FOR FUTURE CONNECTION TO PANEL BY BUILDING CONTRACTOR.
8. ALL UNDERGROUND WIRING IS TO BE RWU (UNLESS OTHERWISE NOTED) - NO ALTERNATES WILL BE ACCEPTABLE.
9. MEGGER ALL LIGHTING AND POWER CIRCUITS TO MEET CODES AND LATEST NETA MANUAL. ALL SECONDARY FEEDER CABLES SHALL BE MEGGER TESTED WITH 1000VDC (FOR CABLE RATED 300V OR LESS MEGGER TEST IS 500VDC) APPROVED MEGGER TEST. HAND CRANKED INSTRUMENTS ARE NOT ALLOWED. SUBMIT MEGGER TEST RESULTS TO ENGINEER PRIOR TO POWER ON.
10. THIS ELECTRICAL CONTRACTOR TO PERFORM ALL REQUIRED VOLTAGE DROP CALCULATIONS AND INCREASE CONDUIT / WIRE SIZES AS NEEDED TO SUIT DISTANCE AND MAXIMUM BREAKER RATING.
11. THIS ELECTRICAL CONTRACTOR TO ALLOW FOR AN ON SITE MEETING WITH HYDRO OTTAWA PRIOR TO COMMENCING ANY WORK. CONTACT Jaymen Heuff (jaymenheuff@hydrootttawa.com, 343-961-5438) FOR MEETING ALONG WITH ANY ADDITIONAL HYDRO OTTAWA DETAILS OR REQUIREMENTS.
12. THIS ELECTRICAL CONTRACTOR TO ARRANGE FOR A PRE-CONSTRUCTION MEETING WITH BELL CANADA PRIOR TO STARTING ANY WORK ON SITE. CONTACT OLGA SANDRI (olga.sandri@bell.ca, 613-406-4508) TO ARRANGE FOR A MEETING ON SITE.
13. NUAL (ALUMINUM) CABLES MAY BE USED AS AN EQUAL ALTERNATIVE TO COPPER. CONDUIT AND WIRE SIZES ARE TO BE UP-SIZED AS REQUIRED TO MEET ALL LOCAL CODE AND AHJ REQUIRMENTS.
14. THIS SITE ELECTRICAL CONTRACTOR SHALL ENSURE THAT THEY ARE EITHER A HYDRO OTTAWA QUALIFIED ELECTRICAL CONTRACTOR OR SHALL HIRE A QUALIFIED ELECTRICAL CONTRACTOR FOR ALL AND ANY WORK RELATING TO HYDRO OTTAWA EQUIPMENT; SUCH AS ROAD CROSSING, MANHOLE, PRIMARY DUCTBANKS, PAD MOUNTED TRANSFORMER, PAD FOUNDATION, TRANSFORMER GROUNDINGS ETC... COORDINATE WITH HYDRO OTTAWA AS REQUIRED.

LIGHT FIXTURE SCHEDULE

TYPE	DESCRIPTION
A	LUMINAIRE/POLE ASSEMBLY CONSISTING OF A DOUBLE (2) LED LUMINAIRES WITH TYPE IV DISTRIBUTION PATTERN, 347V OUTDOOR USE DRIVER ON A 30'-0" SQUARE STEEL POLE WITH POLE BASE COVER ON 36" CONCRETE BASE. COLOUR OF FINISH OF POLE/HEAD ARCHITECT/OWNER SELECTION. LAMPS SHALL BE SUPPLIED WITH THE FIXTURE. FIXTURE TO HAVE FLAT LENS, BE FULL CUT OFF AND DARK-SKY FRIENDLY. SOLERA CORP: HAZE-1-166W-HLV-3500K-TY-IV-CC
A2	LUMINAIRE/POLE ASSEMBLY CONSISTING OF A DOUBLE (2) LED LUMINAIRES WITH A TYPE V SQUARE DISTRIBUTION PATTERN, 5' MAST ARM, 347V OUTDOOR USE DRIVER ON A 30'-0" SQUARE STEEL POLE WITH POLE BASE COVER ON 36" CONCRETE BASE. COLOUR OF FINISH OF POLE/HEAD ARCHITECT/OWNER SELECTION. LAMPS SHALL BE SUPPLIED WITH THE FIXTURE. FIXTURE TO HAVE FLAT LENS, BE FULL CUT OFF AND DARK-SKY FRIENDLY. SOLERA CORP: HAZE-2-300W-HLV-3500K-TY-VS-CC-SMA
A3	LUMINAIRE/POLE ASSEMBLY CONSISTING OF A TRIPPLE (3) LED LUMINAIRES MOUNTED AT 90° WITH A TYPE V SQUARE DISTRIBUTION PATTERN, 5' MAST ARM, 347V OUTDOOR USE DRIVER ON A 30'-0" SQUARE STEEL POLE WITH POLE BASE COVER ON 36" CONCRETE BASE. COLOUR OF FINISH OF POLE/HEAD ARCHITECT/OWNER SELECTION. LAMPS SHALL BE SUPPLIED WITH THE FIXTURE. FIXTURE TO HAVE FLAT LENS, BE FULL CUT OFF AND DARK SKY FRIENDLY. SOLERA CORP: HAZE-2-300W-HLV-3500K-TY-VS-CC-SMA
B	LUMINAIRE/POLE ASSEMBLY CONSISTING OF A SINGLE (1) LED LUMINAIRE WITH A TYPE IV DISTRIBUTION PATTERN, 5' MAST ARM, 347V OUTDOOR USE DRIVER ON A 30'-0" SQUARE STEEL POLE WITH POLE BASE COVER ON 36" CONCRETE BASE. COLOUR OF FINISH OF POLE/HEAD TO ARCHITECT/OWNER SELECTION. LAMPS SHALL BE SUPPLIED WITH THE FIXTURE. FIXTURE TO HAVE FLAT LENS, BE FULL CUT OFF AND DARK-SKY FRIENDLY. FIXTURE TO BE C/W HOUSE SIDE SHIELD. SOLERA CORP: HAZE-1-200W-HLV-3500K-TY-IV-HCO-CC-SMA
C	LUMINAIRE/POLE ASSEMBLY CONSISTING OF A SINGLE (1) LED LUMINAIRE WITH A TYPE II DISTRIBUTION PATTERN, 347V OUTDOOR USE DRIVER ON A 30'-0" SQUARE STEEL POLE WITH POLE BASE COVER ON 36" CONCRETE BASE. COLOUR OF FINISH OF POLE/HEAD TO ARCHITECT/OWNER SELECTION. LAMPS SHALL BE SUPPLIED WITH THE FIXTURE. FIXTURE TO HAVE FLAT LENS, BE FULL CUT OFF AND DARK-SKY FRIENDLY. FIXTURE TO BE C/W HOUSE SIDE SHIELD. SOLERA CORP: HAZE-1-166W-HLV-3500K-TY-II-HCO-CC

NOTES RE: ELECTRICAL SERVICES

(A) 4x100mmC C/W PULLSTRING IN CONCRETE ENCASED STEEL REINFORCED DUCTBANK FROM PROPERTY LINE TO PAD MOUNTED SWITCHGEAR # SC20258 TO HYDRO OTTAWA STANDARDS AND REQUIREMENTS. COORDINATE EXACT DUCT STUB LOCATIONS WITH HYDRO OTTAWA PRIOR TO ROUGHING IN.

(B) 4x100mmC C/W PULLSTRING IN CONCRETE ENCASED STEEL REINFORCED DUCTBANK FROM PAD MOUNTED SWITCHGEAR #SC20258 TO PAD MOUNTED TRANSFORMER TP17383 TO HYDRO OTTAWA STANDARDS AND REQUIREMENTS.

(C) 8 RUNS OF 4#750MCM RWU90 NUAL COMPACT STRANDED CABLES IN 100mmC IN CONCRETE ENCASED STEEL REINFORCED DUCTBANK FROM PAD MOUNTED TRANSFORMER TP17383 TO BUILDING SWITCHBOARD. ALLOW TO PROVIDE ADDITIONAL 30' COIL OF CABLE AT BOTH ENDS FOR CONNECTIONS BY HYDRO OTTAWA AND BUILDING CONTRACTOR. CONFIRM EXACT LENGTH OF CABLE REQUIRED PRIOR TO ORDERING. COORDINATE INSTALLATION WITH G.C ON SITE PRIOR TO COMMENCING ANY WORK.

(D) 10x100mmC IN DIRECT BURIED DUCTS FROM BUILDING ELECTRICAL ROOM TO CNG STATION FOR FUTURE CNG POWER.

NOTES RE: TELEPHONE & CABLE TV & FUTURE USE

(1) 2x100mmC IN DIRECT BURIED DUCTS FROM PROPERTY LINE TO BUILDING ELECTRICAL ROOM TO APPROVAL OF BELL CANADA AND CATV COMPANY. DUCTS TO BE SEPARATED 1m AT PROPERTY LINE.

(2) 4x50mmC IN DIRECT BURIED DUCTS FROM BUILDING ELECTRICAL ROOM TO CNG STATION FOR FUTURE CNG COMMUNICATION.

(3) 2x50mmC IN DIRECT BURIED DUCTS BUILDING ELECTRICAL ROOM TO ENBRIDGE HIGH-PRESSURE STATION FOR FUTURE USE.

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Revisions

No.	By	Description	Date
01	BK	ISSUED FOR UTILITY	2025-09-11

Project

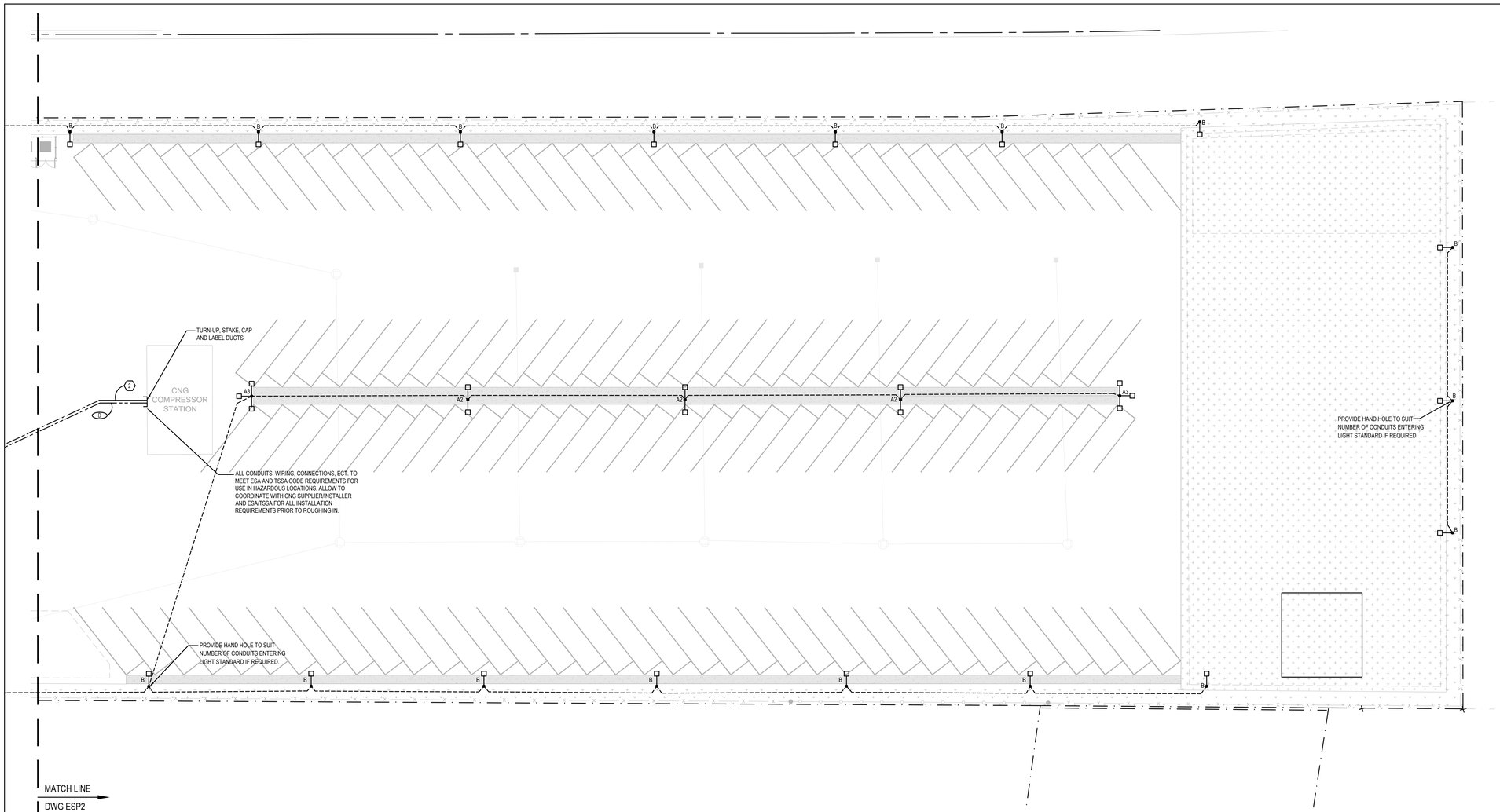
WO MW REALTY LIMITED OFFICE GROUP SITE PLAN APPLICATION NEW MILLER WASTE FACILITY

3145 CONROY ROAD, OTTAWA, ON

Drawing

ELECTRICAL SITE PLAN - PART 1

Scale: AS NOTED
Stamp
Drawn: BD
Checked: BK
Project No.: 25-000-087
Drawing No.: ES2.1
Date: MAY 2025



1 ELECTRICAL SITE PLAN
ES2.2 SCALE: 1:400

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WO MW REALTY LIMITED OFFICE GROUP
SITE PLAN APPLICATION
NEW MILLER WASTE FACILITY

3145 CONROY ROAD, OTTAWA, ON

Drawing

ELECTRICAL SITE PLAN - PART 2

Scale: AS NOTED

Stamp

Drawn: BD

Checked: BK

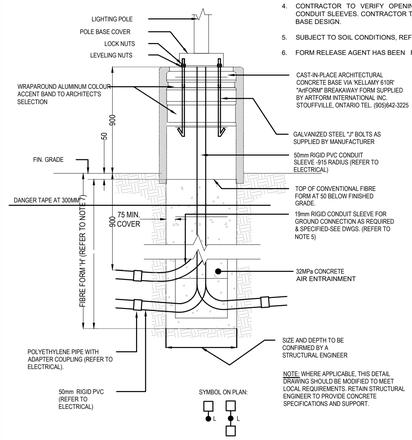
Project No.: 25-000-087

Drawing No.: ES2.2

Date: MAY 2025

NOTE:

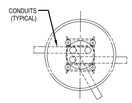
- CONCRETE BASES FOR LUMINAIRES TO BE SUPPLIED AND INSTALLED BY THIS ELECTRICAL CONTRACTOR.

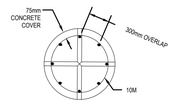


NOTE: WHERE APPLICABLE, THIS DETAIL DRAWING SHOULD BE MODIFIED TO MEET LOCAL REQUIREMENTS. RETAIN STRUCTURAL ENGINEER TO PROVIDE CONCRETE SPECIFICATIONS AND SUPPORT.

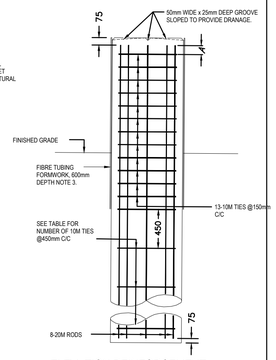
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES OR METRES.
2. CLASS OF CONCRETE SHALL BE 32mPa. AIR ENTRAINMENT.
3. MINIMUM OF TWO SLEEVES REQUIRED FOR EACH CONC. FOUNDATION UNLESS OTHERWISE SHOWN.
4. CONTRACTOR TO VERIFY OPENING SIZE IN POLE BASE PLATE PRIOR TO SETTING CONDUIT SLEEVES. CONTRACTOR TO PROVIDE STRUCTURAL ENGINEER APPROVAL FOR BASE DESIGN.
5. SUBJECT TO SOIL CONDITIONS, REFER TO SOIL REPORT.
6. FORM RELEASE AGENT HAS BEEN FACTORY-APPLIED TO INSIDE SURFACE OF "ArtFORM".



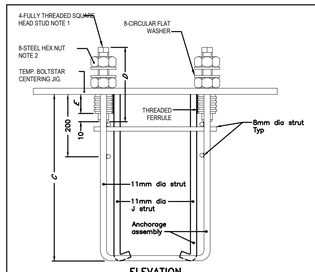


PLAN VIEW



ELEVATION REINFORCEMENT

POLE LENGTH m	BURIAL DEPTH H m	ROD LENGTH m	A mm	NO. OF 10M TIES @450mm C/C	BOLT CIRCLE DIA FOR METAL POLES		
					ALUMINUM	STEEL	SECTIONAL STEEL
5.6	2.15	2.00	100	3	N/A	N/A	449
7.0	2.15	2.00	100	3	N/A	N/A	449
7.5	2.15	2.00	100	3	406	406	N/A
8.7	2.45	2.30	250	3	N/A	N/A	449
9.0	2.45	2.30	0	4	406	406	N/A
10.5	2.60	2.45	100	4	406	406	449
12.0	2.75	2.60	150	4	406	406	N/A
13.6	2.90	2.75	0	5	406	406	N/A
15.1	3.05	2.90	100	5	406	406	N/A

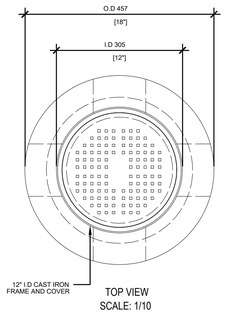


NOTE:

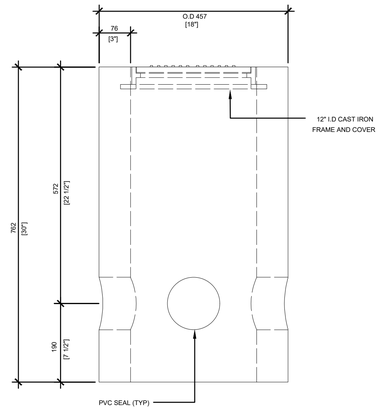
1. STUDS SHALL BE FACTORY SET WITH PRE-APPLIED THREAD LOCKING COMPOUND AND SHALL REMAIN IN PLACE DURING FOOTING AND POLE INTALLATION.
2. ASSEMBLY NUTS SHALL BE SHIPPED HAND TIGHT ONLY.
3. THE WELDS SHALL DEVELOP THE STRENGTH OF THE STRUTS.
4. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN.

ASSEMBLY DIMENSIONS					
STUD DIA	STUD LENGTH D	BOLT CIRC. DIA A	STUD DISTANCE B	FERRULE LENGTH E	ANCHORAGE DEPTH C
					250mm FOR STRUCTURES
32mm (1-1/4")	230	406	287	75	457
		449	318		457
19mm (3/4")	180	190	135	38	305

TYPICAL CONCRETE BASE FOR LUMINAIRE
26-56-13-012



TOP VIEW
SCALE: 1/10



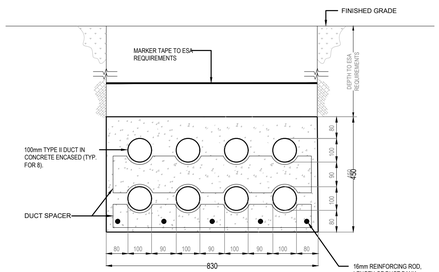
FRONT VIEW
SCALE: 1/10

GENERAL NOTES :

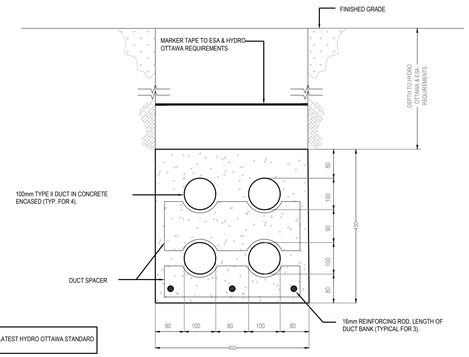
1. CABLE ENTRY OPENINGS - 4-3/4" PVC SEALS
2. DELIVERY IS MADE BY CRANE-EQUIPPED TRUCKS
3. EXCAVATION MUST BE READY, SAFE AND ACCESSIBLE FOR UNLOADING FROM THE REAR OF THE TRUCK.
4. MIN OVERHEAD CLEARANCE OF 18FT IS REQUIRED
5. ALL UNITS MUST BE HANDLED WITH PROPER LIFTING EQUIPMENT (I.E. SPREADER BAR)

PRECAST CONCRETE ELECTRICAL HANDHOLE
MEETS OPSD 2112.020 N.T.S.

TYPICAL 8x100mmC DUCTBANK N.T.S.



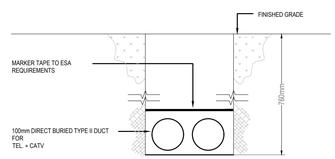
TYPICAL 4x100mmC DUCTBANK N.T.S.



PRIMARY DUCTBANK TO LATEST HYDRO OTTAWA STANDARD AND REQUIREMENT

1 TEL./DATA + CATV DUCTS N.T.S.

NOTE:
WHERE POSSIBLE, DUCTS SHALL RUN ABOVE THE CONCRETE ENCASED STEEL REINFORCED DUCTBANK.



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SITE PLAN APPLICATION
NEW MILLER WASTE FACILITY

3145 CONROY ROAD, OTTAWA, ON

Drawing

ELECTRICAL
NOTES & DETAILS

Scale: N.T.S.

Stamp

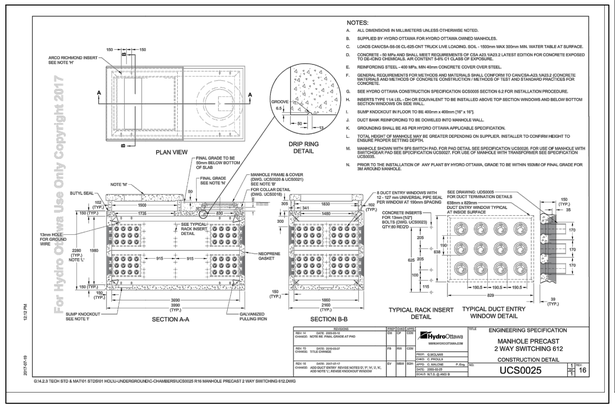
Drawn: BD

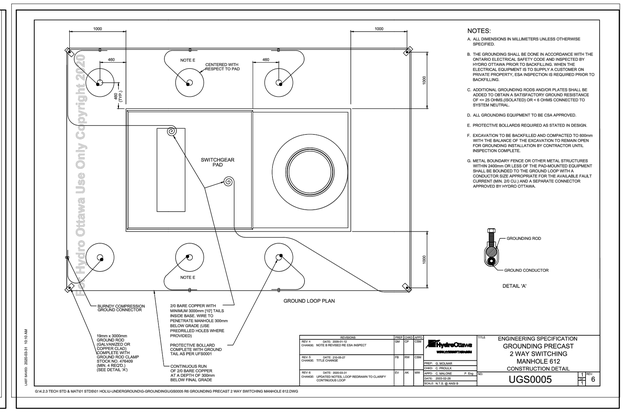
Checked: BK

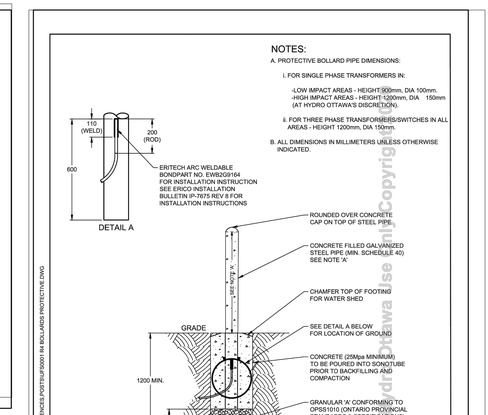
Project No.: 25-000-087

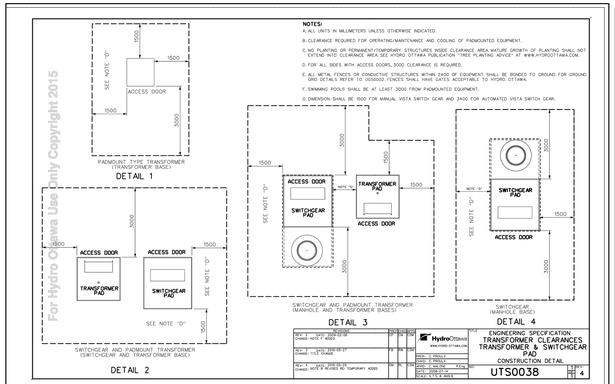
Drawing No.: ES3

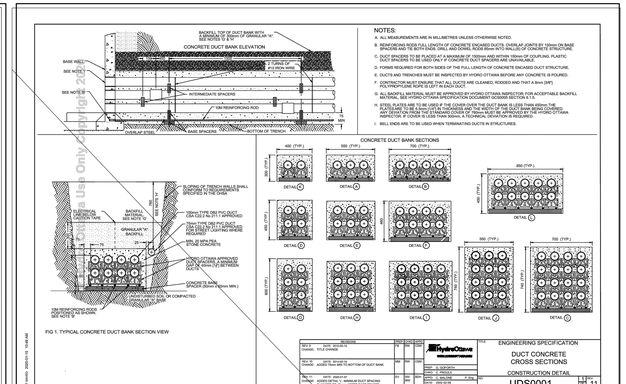
Date: MAY 2025

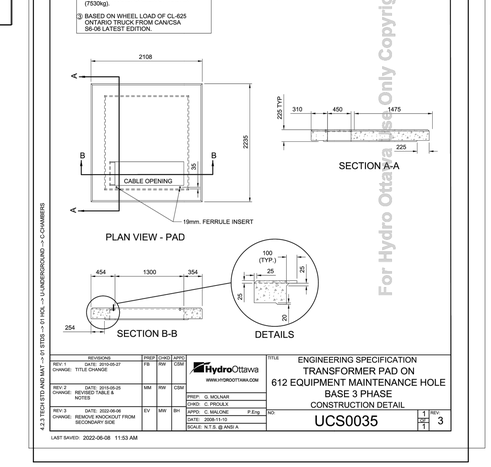












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North

Revisions

No.	By	Description	Date
01	BK	ISSUED FOR UTILITY	2025-09-11

Project

WO MW REALTY LIMITED
OFFICE GROUP
SITE PLAN APPLICATION
NEW MILLER WASTE FACILITY

3145 CONROY ROAD, OTTAWA, ON

Drawing

ELECTRICAL
HYDRO OTTAWA DETAILS

Scale: N.T.S.
Stamp
Drawn: BD
Checked: BK
Project No.: 25-000-087
Drawing No.: ES4
Date: MAY 2025